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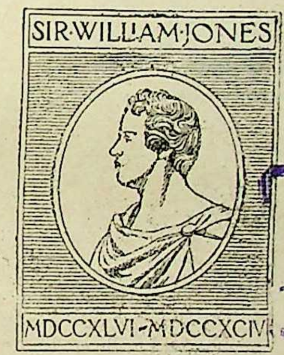
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पुस्तकालय
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हरिद्वार

Article No. 1.

Studies on Rigvedic Deities—Astronomical and Meteorological.

By Ekendranath Ghosh.

Introduction.

The present work is a collection of twenty-one papers which were read in the monthly meetings of the Asiatic Society of Bengal in the course of two years or so. These papers, originally without any arrangement, are now published together, and are arranged according to the subject matter.

The numerous deities invoked in the hymns of the Rigveda comprise celestial, atmospheric, and terrestrial objects of various forms. Even common articles of daily use and various abstract matters (as mind, soul, etc.) have been personified as deities. In this present series of articles, we are concerned only with deities whose physical nature can be interpreted from the astronomical and meteorological points of view.

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I. HEAVEN (DIV), FIRMAMENT (ANTARIKṢA), AND EARTH (PṚTHIVĪ).

1. *Worlds in general.*

Throughout the ten maṇḍalas of the Rigveda, we have numerous references to different worlds, under different names, either individually or in groups.

First, let me enumerate the different worlds as they are mentioned in groups.

(1) Dyaus (Dyāvā, Div), Antarikṣa and Pṛthivī (I. 115. 1; II. 12. 2, with parvatas; III. 22. 2, with water and herbs; III. 54. 19, with the sun; VII. 35. 5; X. 59. 7; etc.). There are references to objects pertaining to them in several places (VI. 22. 8; VIII. 6. 15; X. 65. 9).

(2) Div, Rodasī and pṛthivī (wide) Antarikṣa (II. 15. 2; X. 88. 3).

(3) Div, At (occurring as Adbhyaḥ, from the sky according to Sāyaṇa) and Pṛthivī (II. 38. 11).

(4) Div, Pṛthivī (Antarikṣa, according to the Nighaṇṭu) and Bhūmi (V. 85. 4).

(5) Div, Apa and Pṛthivī (X. 88. 2).

(6) Div, Jma (Pṛthivī—Nighanṭu, I. 1), A[illegible] heights, [illegible] the [illegible] 52. 15).

(7) Div, Ṛta, Pṛthivī (VI. 41. 1).

(8) Div, Āpa and Kṣiti (III. 13. 4).

(9) Dyāvā Kṣāmā (heaven and earth) and pṛthivī (wide) Antarikṣa (III. 8. 8). They have also been used in plural for the objects connected with them (VIII. 70. 4).

(10) Rodasī (Dyavā pṛthivī) and Antarikṣa (I. 73. 8; V. 85. 3; VII. 12. 24; X. 139. 2).

(11) Rodasī and Madhya (middle region) (X. 55. 3).

(12) Rodasī and Div (sky as loosely applied) (I. 33. 5).

(13) Rodasī, Ṛṣva (highly placed) Nāka (Div or Āditya according to Nighaṇṭu, 1. 4) and Nakṣatra (VII. 86. 1).

(14) Rocanā, Dyavābhūmī, Antarikṣāḥ and svarnaram Pṛthivī (X. 65. 4).

(15) Parama Vyoma (VI. 8. 2) which is said to be inhabited (IV. 40. 5).

These regions have been further subdivided, as we shall see below :—

(1) Three Antarikṣas, three Rajasas, three Rocanas, three Divas, and three Pṛthivīs (IV. 53. 5).

(2) Three Mothers (earths), three Āpas, and Tridiva (three Divas) (III. 56. 5).

(3) Three Divas (I. 35. 6 ; VII. 101. 4).

(4) Three upper Rocanas (luminous regions or bodies) (III. 56. 8).

(5) Three Bhūmī (in dual), that is, three Dyāvābhūmīs (VIII. 41. 9).

(6) Three Pṛthivīs (I. 34. 8) ; also tridhātu (three-regioned?) Pṛthivīs.

Next, we are told something about the creation of the worlds.

(1) Div (heaven) arose from the head, Antarikṣa (sky) from the navel, and Bhūmi (earth) from the feet of Puruṣa (X. 90. 14).

(2) 'Ka' (Who ?—Brahman) is the Creator of the Div, Āp, and Pṛthivī (X. 121. 9). He placed Div and Pṛthivī in position (X. 121. 1).

(3) Brahman made Div and Pṛthivī firm (in position); Svar and Nāka are supported by him ; he arranged for water in the sky (X. 121. 5).

(4) Viśvakarman spread the extensive Div after having created the earth (X. 81. 2).

(5) The Creator created the sun, moon, Div, Pṛthivī, and Antarikṣa in proper time (X. 190. 3).

Lastly, we are informed of some general facts about them.

(1) There are thirty-three Devas in all: Eleven in heaven, [illegible]th, and eleven in the sky (I. 139. 11).

(2) The two Rocanas (luminous regions) are placed above the sun and Āpa (sky) is situated below it (III. 22. 3).

(3) Indra by Śacī (ability) holds Div and Pṛthivī all round, as a wheel is held by an axle (X. 89. 4).

(4) Pūṣan remains in the high Div, Soma on the pṛthivī Antarikṣa (sky) (Pṛthivyām here is better and more reasonably made to qualify Antarikṣa and signifying vast in extent) (II. 40. 4).

(5) The Sun has been requested to protect from (the disturbances arising in) Div, Vāyu from (those of) Antarikṣa, and Fire from (those of) Pṛthivī (X. 158. 1).

(6) The Soma goes round the high regions of Pṛthivī from Div and Antarikṣa (IX. 63. 27).

(7) The Dawn spreads over Div and large Antarikṣa (IV. 52. 7).

All the passages above referred to lead one to the idea that the Rigvedic sages recognised three well-defined worlds, viz. heaven, sky, and earth. A fourth region is also mentioned as *parama Vyoma*—a space at a great distance.

The heaven (*Div*), as its name implies, is characterised by luminous bodies. It is the highest of the three worlds. *Nāka* indicates the highest region of the heaven beset with stars

(I. 34. 8; III. 2. 12; etc.); it may have been referred to as the higher region of the sky (I. 19. 6), where it is said that the Devas live on the top of the Nāka in the luminous region; it might have indicated the boundary line between the heaven and sky.

The heaven and earth have been mentioned or addressed many times under the names of *dyāvāpṛthivī*, *dyāvākṣāmā*, *dyāvābhūmī*, *rodasī*, and *rajasī*.

The sky or firmament has usually been mentioned as *antarikṣa* (literally meaning 'the region below the stars'). It has also been named *rajas*, *madhya* (middle region), *āpa* (region of waters), and sometimes *pṛthivī* (extensive region). Sometimes the word 'div' has been loosely used for it. It is distinctly the world (or rather the space) between the heaven above and earth below.

The earth is usually named *pṛthivī*, but is also called by the names *bhūmī*, *kṣāmā*, and *jmā*.

These three regions have been further subdivided, usually into three each. It is rather difficult to form an idea of the extent of these subdivisions from the meagre materials we have at our disposal.

There are three divisions of the heaven. *Nāka* is the highest region with stars, according to the majority of the sages. Further, there is mention of two (other ?) luminous regions of the heaven above the sun. Even a superficial observer of the heaven, after having looked at it for several nights, will be able to distinguish three strata of the heaven, the lowest one with the moon, the middle one with the planets, and the topmost one with fixed stars. The sun's place, according to several passages, is also in heaven.

I shall consider this again, in connection with heaven.

Sky has a similar threefold division. Here, with still more uncertainty, we take the highest region with the path of the sun (I. 35. 11), the middle clear region and the lowest cloudy region. Here, too, we have mention of three antarikṣas and three rajasas in the same passage (IV. 53. 5). This can only be reconciled if we think of three clear upper layers and three cloudy lower layers.

Lastly, we find the same threefold division of the earth. These may doubtfully be taken to be the mountainous regions, the plains and the watery tracts.

2. *Individual Worlds.*

As we have still much to learn of the three individual worlds, I shall discuss them one after another.

(*a*) HEAVEN.—This world has been addressed as *div*, *svar*, *nāka*, and *tridiv*.

Heaven has been addressed as the father (I. 89. 8). It is regarded as the grandfather of the Aśvins (I. 184. 1 ; X. 61. 4) and of Indra-Varuṇa (III. 38. 5), and as the father of the Aśvins (I. 117. 12 ; etc.), Agni (III. 1. 6, 9 ; III. 31. 9), the sun (IV. 15. 6 ; X. 37. 1), the Maruts (X. 71. 2), Parjanya (VII. 102. 1), the dawn (IV. 30. 8 ; etc. many times), and the night (X. 127. 8). Again, Indra (VIII. 36. 4 ; VIII. 63. 2) and Soma and Pūṣan (II. 40. 1) are regarded as the fathers (originators) of the heaven.

Aśvins (VI. 62. 1 ; X. 143. 3) and the Maruts (II. 36. 2) are the leaders of heaven. Maruts, again, are the guides of the heavenly path (V. 54. 10). Indra is the lord of heaven (VIII. 13. 8, 12 ; X. 111. 3). Heaven is made to tremble by Indra (I. 61. 14 ; IV. 22. 3) and by the Maruts (I. 37. 6).

Heaven is the abode of gods and other objects. We find mention of Agni (III. 27. 12), Aśvins (I. 30. 9 ; I. 180. 10 ; IV. 43. 5), Indra (V. 74. 1 ; etc.), Ṛbhus (III. 33. 1 ; IV. 36. 1), the dead Fathers (X. 15. 14), Pūṣan (II. 40. 4), Maruts (V. 87. 3), Mitra-Varuṇa (X. 65. 7), Rudra (I. 114. 5 ; I. 122. 1 ; VII. 46. 3), Vṛhaspati (X. 67. 10), Vena (IX. 85. 10), Soma (IX. 97. 13 ; IX. 85. 9 ; etc.) and the sun (IX. 113. 10, referred to as the 'root' or basis of the worlds). Indra is said to have disposed the 'month' on heaven (X. 138. 6). The sun rises in heaven (I. 50. 11 ; VII. 63. 4), his disc remains in heaven (V. 27. 6) and his chariot moves in heaven (X. 138. 3). The circular path of the sun, consisting of twelve divisions, lies in the heaven (I. 164. 11). The eye of the sun appears in heaven after an eclipse (V. 40. 8). The three regions of heaven are laid in Varuṇa, who made the golden sun swing in heaven for benefit (VII. 87. 5). Saramā, the bitch, came to the Paṇis from heaven above (X. 108. 5). There are eagles in heaven (X. 92. 6 ; X. 94. 5), evidently referring to the constellation Aquila. Night and dawn come, one before another, in heaven and earth, and travel in them (I. 62. 8). The light of dawn arises in heaven (VI. 64. 2). Dawn spreads over heaven (IV. 52. 7).

Again, heaven is the place of water. Extensive tracts of water are located in heaven (IX. 113. 8). Three streams of heavenly water flow away in three directions (VII. 101. 4). These evidently refer to three branches of the milky way. The cloud (*vṛṣabha*) arises in heaven (VII. 36. 3). Water is formed in heaven (I. 33. 10 ; IV. 57. 5 ; VI. 13. 1) by the gods (X. 114. 1). Rainwater is held in heaven by Prajāpati (I. 164. 25). The Maruts also hold water in heaven (VI. 66. 11). Mitra-Varuṇa are the lords of water in heaven and earth (VII. 64. 1). Indra (I. 54. 7 ; I. 56. 5 ; VI. 44. 21), Maruts (V. 57. 1 ; V. 83. 6), Soma (IX. 108. 10) and Mitra-Varuṇa (V. 63. 6 ; V. 83. 6) help in downpour of rain from heaven. The Visvadevas milk the lying one (that is, cloud) in heaven (III. 57. 2).

All these passages may refer to the milky way (celestial waters) or they may really indicate the sky, the word *div* being loosely applied.

Now let us consider the position of heaven and how it is held in its place. Heaven is distant from us (VI. 40. 5) and is placed above the sea (sky, according to Sāyaṇa) (VIII. 97. 5). Heaven is held by itself (V. 32. 10) and is supported by Indra without a pole (avaṃśe) (II. 15. 2). Indra held it so firmly that it may not fall down (II. 17. 2, 5 ; II. 27. 8 ; III. 30. 9). He supports it high above the earth (X. 55. 1). The sun also holds the heaven without support (X. 149. 1) and is regarded as the supporter of heaven (IV. 13. 5). He has placed it higher up (IV. 31. 15). Soma, again, is said to support it like a pillar (IX. 74. 2) and she is regarded as acting as a pillar (IX. 87. 2). In one place (VI. 72. 2), Indra and Soma are regarded as having held the heaven by a support (sky, according to Sāyaṇa). Lastly, Agni (II. 11. 5), Mitra (III. 59. 1), Mitra-Varuṇa (V. 62. 3), Varuṇa (VIII. 42. 1), and Ṛbhus (X. 66. 10) are also said to support the heaven.

There are other characteristics of heaven. (1) It is constantly bright (IX. 113. 7), with bright regions (IX. 113. 9). It is called luminous (*devī*) (V. 32. 10). It is decorated with stars (II. 2. 5 ; II. 34. 2 ; VIII. 55. 2 ; X. 68. 11 ; X. 111. 7). There is mention of meteors in heaven (X. 68. 4). It is recognised by Navaḥs (Ādityas according to Sāyaṇa) (II. 4. 6). (2) There are two gates (I. 48. 15), a staircase (I. 52. 9) and the sea (X. 98. 10) in heaven. (3) Heaven is imperishable (IX. 113. 7), undecayable (IX. 113. 7). There is every kind of pleasure in heaven and all desires are fulfilled there (IX. 113. 10). (4) Vaivasvata is the king of heaven (IX. 113. 8).

Lastly, we may consider briefly the divisions of heaven already alluded to. We are informed of the highest (*uttama*), middle (*madhyama*) and lower (*avama*) regions of heaven (V. 60. 6). There are three Divas and three Nākas in heaven (IX. 113. 9). The three Divas are said to hold the luminaries (*rocanas*) (II. 27. 9) the regions of which are again three in number (I. 105. 5 ; VIII. 10. 1 ; VIII. 82. 4 ; IX. 17. 5). Nāka is the highest region of heaven (IX. 73. 4 ; IX. 85. 10 ; X. 130. 2) ; it is the back of heaven (III. 2. 12). The wide, high Nāka was held up by Viṣṇu (VII. 99. 2). It is provided with stars (I. 68. 5 ; VI. 49. 12). It is the abode of gods (I. 19. 6 ; I. 164. 50 ; VII. 58. 1 ; X. 90. 16 ; etc.). The Rocanas (luminaries) shine in heaven (I. 6. 1 ; I. 81. 5 ; VI. 7. 7 ; IX. 37. 3 ; etc.). They are said to form the third region of heaven (VI. 44. 23 ; IX. 75. 2). Commencing from below, we may take the three strata of luminaries (those of the sun, moon, and planets) as forming the third (lowest) region, the regions of the stars (divided into three) as forming the highest region and an intermediate second region of the heaven.

(*b*) EARTH.—The earth has been mentioned or addressed as *pṛthivī* in most of the passages, *kṣiti* (I. 65. 3 ; V. 35. 2 ; VI. 46. 7 ; etc.), *pṛthivī* (X. 31. 9, the word elsewhere signifying 'spacious' and used for qualifying various regions), *bhūmi* (III. 30. 9 ; V. 85. 4 ; IX. 61. 10 ; etc., the word being also used for ground in II. 11. 7 ; IV. 26. 2 ; IV. 57. 8 ; VI. 47. 20), *avani* (II. 13. 7, also used for river, as in I. 190. 7 ; V. 85. 6 ; etc.) and *gālū* (earth or ground, V. 32. 10). The word *kṣiti* in the plural has been used to mean people on earth (V. 32. 10 ; V. 36. 6 ; VI. 1. 5).

Earth is regarded as mother (V. 72. 2 ; VIII. 103. 2 ; X. 62. 3 ; etc.). Indra (VIII. 36. 4) and Soma and Pūṣan (II. 40. 1) are the fathers or originators of the earth. Indra (II. 15. 2 ; VIII. 89. 5) and Indra and Soma together (VI. 72. 2) make her spread (that is, become vast in extent).

Indra made the shaking earth firm and the trembling mountains quiet (II. 12. 2). This probably refers to an earthquake. Again, the earth trembles from fear of Indra (I. 61. 14 ; IV. 22. 3) and Maruts (I. 37. 6). Indra shook the earth and produced curls (clouds, according to Sāyaṇa) in the heaven (VIII. 14. 5).

Downpour of rain occurs on the earth through the agency of Indra (VI. 44. 21), Maruts (VI. 54. 8) with the help of clouds (I. 39. 9 ; I. 164. 47 ; V. 83. 4) and Soma (IX. 8. 8 ; IX. 96. 3). Lightening appears on earth in a downward direction (I. 168. 8). Vāyu travels on earth by scattering dust on all sides (X. 168. 1).

Earth is supported by Indra (I. 67. 1 ; II. 15. 2 ; II. 17. 5 ; X. 89. 4), Mitra (III. 59. 1), Mitra-Varuṇa (V. 62. 3) and Soma (IX. 86. 29 ; IX. 100. 9 ; etc.). Indra fixed the earth in her own place (III. 30. 9). Varuṇa holds the eastern side of the earth (VII. 99. 2).

Varuṇa is said to know the extent of the earth (VIII. 42. 1) and he measured her extent through the sun (V. 85. 5). The sun holds all the worlds. He gave origin to the earth and heaven, after having measured them with good fingers (IV. 54. 8).

As regards the position of earth, we find it mentioned that it is placed at the base of (that is, below) the sky (II. 2. 3).

She is the abode of water (V. 66. 5 ; X. 73. 9 ; etc.), herbs (III. 22. 2 ; X. 27. 23 ; X. 73. 9) and trees (I. 39. 3 ; III. 8. 3). She holds the mountains (V. 84. 1) and the trees on the ground (V. 84. 3). She is the abode of men (I. 22. 15 ; VII. 59. 3 ; VI. 1. 5 ; VII. 100. 4). Men travel in different directions on earth by land (X. 56. 7).

There are several other characteristics : it is wide (I. 131. 1 ; III. 30. 9), unlimited (III. 30. 9), strong (III. 30. 9), giver of comfort (III. 30. 9), and is sustainer of all (II. 17. 5).

There are eight directions of the earth (I. 35. 8).

There are three regions of the earth (VII. 104. 11); they are disposed in six ways (VII. 87. 5; Sāyaṇa takes them to mean six seasons).

Again, in Puruṣa-sūkta (X. 90. 1), we are told that Puruṣa (the Divine being) has one thousand heads, a thousand eyes, and a thousand feet. He extends over a space of ten fingers after having fully spread over the earth.

Lastly, there are passages in the Rigveda which tend to suggest that the Rigvedic sages had idea of the axial rotation and orbital motion of the earth. Although several Vedic scholars had already tried to produce evidences on this matter, Paṇḍit Tārakeśvar Bhaṭṭāchārya discussed it fully in Bengali in the periodical, *Bhāratavarṣa*, Bengali era 1326, Vol. 7, Part I, p. 729. The evidences are quite convincing. As the paper is out of reach beyond Bengal, the subject is briefly dealt with here. First, on the rotation of the earth. The earth is revolving (*uruci*) (VII. 35. 3). The sun, having fixed the earth so that she may not fall down, has put her in her place and is making her revolve (VI. 8. 3). The heaven and earth is revolving together (VIII. 6. 5). The earth is revolving with day on the eastern half and with night on the other (VI. 9. 1). Again we are told that what is the upper region becomes lower and what is the lower region becomes upper; the moon, sun, and the other heavenly bodies seem to be in motion to us, as (a fixed place) to one on wheel (that is, moving in a carriage) (I. 164. 19). The dawn is making the sun visible on the eastern half of the earth (I. 92. 1); she is giving birth to the sun on the east (VII. 78. 3). These two passages evidently indicate that the rising of the sun is the work of somebody else. There is a long passage in Taitt. Br. (3. 4. 6.), which distinctly points to the fixity of the sun: The sun never sets, nor he ever rises. When he appears to set, he terminates the day in that region and does the opposite, that is, gives rise to night in that region and day in the other; again, when he seems to rise in the morning, he gives rise to day in that region and night in the other. Next, on the orbital motion of the earth. The earth is movable and is capable of travelling (V. 84. 2). The sun is making the earth travel (IV. 56. 3). The sun is making the heavy earth move with his fingers (VI. 54. 4). The earth's motion is not irregular (I. 160. 4). The sun, by his attraction, has placed the earth in space (without support) and is making her move (X. 149. 1). The long, eastward and heavenly path of the earth extends on the east (X. 110. 4).

(ङ) HEAVEN AND EARTH.—These are mentioned or addressed in a large number of passages under the names of *dyāvāpṛthivī* (in five hymns dedicated to them and elsewhere), *dyāvākṣāmā*, *dyāvābhūmī*, *rodasī*, and *rajasī*. They have also been referred to as Father and Mother (I. 121. 5; I. 161. 10; X. 54. 3) and have also been qualified as such (V. 43. 2; VI. 70. 6; X. 65. 8).

The term *rodasī* has also been used to qualify dyāvāpṛthivī (II. 1. 15; VII. 5. 4) and dyāvābhūmī (X. 12. 4) showing its significance. The term, however, has also been applied to the earth only (as in Rodasī and Div—V. 61. 12; VI. 48. 6; IX. 74. 2, if we do not accept 'div' to mean the sky). In another place (VIII. 70. 5), *rodasī* might have meant the sky. Lastly, there is a phrase *pṛṣni suretas vṛṣabha* and the word *dhenu* (I. 160. 3) which seem to refer to heaven and earth respectively. The phrase evidently means spotted (starry) downpourer with good germs (one capable of fertilising by rain).

We have references to objects relating to heaven and earth (X. 32. 2).

The gods are regarded as their sons (I. 185. 4).

They are paired (I. 159. 4; III. 54. 7) and are like two sisters (I. 159. 4; I. 185. 5; III. 54. 7). They have a common origin (I. 159. 4).

Indra begot the heaven and earth together (X. 54. 3). He spread over them all round (II. 15. 2). He follows them as he does the circle of Etaśa (VIII. 6. 38). Again, he made them tremble (VIII. 97. 14).

Heaven and earth are held fast by Varuṇa with a prop (VIII. 41. 10), separately or firmly (*viṣkabhita*) (VI. 70. 1). The Sun is said to hold them with undecaying supports (I. 160. 4). Soma is also said to support them (IX. 101. 15). Again the sky is placed between them for their support (III. 38. 3). Again, they are said to be without support (IV. 56. 3) and fixed, immovable, and footless (I. 185. 2). The dawn remains on one side of heaven and earth (VII. 80. 1).

Indra and Varuṇa are said to have measured their extent after having anointed them together (III. 38. 3).

They are said to remain together (united?) (I. 185. 5; III. 38. 3; III. 55. 20; X. 89. 13) and have the same boundary (I. 185. 5). They enclose everything between them (VI. 70. 1; IX. 81. 5). Again, they are said to remain separate (I. 159. 4) and not to cling to each other (I. 160. 2; VI. 70. 2). They are separated equally all round (*ante*) and remain in the fixed point (*dhruva pade*) at a distance (III. 54. 7). They revolve like a wheel as the day and night (I. 185. 1). The sun (I. 160. 4) and Aśvins (IV. 34. 9) make them separate. The sun moves between them (I. 35. 9). The moon appears between them (III. 61. 4).

They are the abodes of gods (I. 185. 6).

They are intimately connected with water, as shown by numerous epithets bestowed upon them, viz. *bhūri retasā* (VI. 70. 1), *bhūri dhāre* (VI. 70. 2), *payasvatī* (VI. 70. 2), *kṣīra prasavinī* (III. 6. 4), *ghṛtasnu* (X. 12. 4), *ghṛtavṛdhā* (VI. 70. 4), *madhudugha* (VI. 70. 5), etc.

They have other characteristics assigned to them. Thus they are youthful (III. 54. 9) and ever remain so (I. 185. 5); they are wide in extent (I. 185. 6; I. 160. 2; IV. 56. 3; etc.), limitless (I. 185. 7) and deep (IV. 56. 3).

(*d*) SKY OR FIRMAMENT.—The sky is referred to as *Antarikṣa* (signifying the region below the stars) in a large number of passages, but is also addressed by the name of *Antar* (I. 105. 1), *Abudhna* (rootless) (VIII. 77. 5), *Rajas* (I. 50. 7; I. 56. 5; I. 62. 5; etc.; also used in other senses elsewhere), *Āpa* and *Nabhas* (VII. 97. 6; IX. 71. 1; X. 30. 9; etc.). The words *Div* and *Nāka* have also been loosely applied to it.

Ṛbhus are considered as the leaders of the sky (I. 110. 6).

Indra (III. 30. 9; III. 49. 4) and Soma (VI. 47. 4) are said to hold the sky.

The sun (VII. 45. 1), dawn (VII. 75. 3; X. 95. 17) and Indra (I. 51. 2; II. 15. 2; VII. 98. 3) are said to fill the sky with light. Again Indra (II. 12. 2) and Varuṇa know the extent of the sky through the sun (V. 85. 5).

The sky is the abode of the gods (I. 48. 12; III. 6. 8; V. 53. 8; IX. 5. 2; etc.). Vāyu spreads in the sky (I. 161. 14; X. 168. 3). The sun's path is on the sky (I. 35. 11). Pūṣan's boat travels in the sky (VI. 58. 3) and that of Aśvins (I. 116. 3) as well.

The sky is blue (VII. 97. 6), wide in extent (I. 91. 22; II. 15. 2; etc.), spacious (III. 55. 191; IV. 52. 7; etc.), bright (VIII. 14. 7) and decorated with stars (III. 55. 19). Rain-water collects in the sky (IX. 71. 1; X. 30. 9) and clouds spread in the sky (V. 83. 3).

3. *Remarks.*

Considering the various facts regarding Div, Antarikṣa, and Pṛthivī and the different characteristics assigned to them, we may take them to represent the heaven, sky, and earth—the three regions of the universe. The sages also recognised a fourth very distant space under the name of *parama Vyoma*.

In this connection we must consider the views of V. G. Rele, as set forth in his work entitled 'The Vedic Gods as figures of Biology'. This scholar regards the heaven, sky, and earth as the three portions of the human Central Nervous System. He cites numerous passages from the Rigveda, mostly irrelevant, as evidences in favour of his view. I shall select the more important ones and see how far they actually support his views.

Heaven is identified with the brain, or rather the two cerebral hemispheres together. These are two large bodies with a deep cleft between them. They are comparable to the kernel of walnut. He tries to prove the dual nature of the heaven and earth (that is, there are two heavens and two earths) from various passages (I. 159. 4; I. 160. 2, 5; III. 38. 3; III. 55. 20; VIII. 37. 4; X. 89. 4; etc.) all of which, however, simply mean 'heaven and earth' and not 'two heavens' or 'two earths'.

Earth is identified with the spinal cord, the long cylindrical body which occupies the canal of the back bone. He cites a few passages (I. 24. 7 ; III. 38. 3 ; X. 81. 4 ; etc.) as a proof that the earth of the Ṛigvedic sages is not a circular body but a long narrow rod-like structure, like the spinal cord. The first passage has a phrase *vanasya stupa* which he takes to mean 'the stem of a tree', but, considering the context, *vana* really means 'rays' (Nighaṇṭu, I. 8). A portion of the second passage means 'from what wood or tree were heaven and earth fashioned ?' It does not necessarily mean that the earth was rod-like in shape. Even if we take it to be so, we should also consider the heaven of the same shape. In the third passage, he takes *rodasī* as two earths and *mātrā* as a 'measuring rod', but *rodasī* actually means heaven and earth and if *mātrā* be an indication of the 'lengthwise expanse of the earth' according to his interpretation, then both the heaven and earth would be rod-like.

Lastly, the sky is identified with the middle portion of the central nervous system. It is a short pyramidal body lying in an oblique direction beneath the cerebral hemispheres connecting them together with the spinal cord. He cites a few passages (II. 15. 2 ; IV. 56. 3) to indicate that the sky is rafterless, but they refer to the heaven and heaven and earth respectively and not to the sky. Another passage (I. 56. 5), referred to as an indication that the sky 'is located on the top of the posts that support the heaven', has nothing to suggest this import. He also cites another passage (VII. 99. 3) interpreting it that Viṣṇu fixes the earth to the heaven by pegs. *Mayukhāḥ* which he takes to be pegs, mean sun's rays (Nighaṇṭu, I. 8). In much later times it is made to represent, evidently secondarily, the pin of a sun-dial.

Taking these facts into consideration, I cannot accept his views. The various characteristics of the three regions, as we find them in the Ṛigveda, seem to be quite clear and to show that they are really the heaven, sky, and earth.

II. VISIBLE PORTION OF THE CELESTIAL SPHERE.

DITI AND ADITI.

The word *diti* occurs three times. Once (VII. 15. 12) she is simply invoked for wealth. In two other places Diti and Aditi are prayed to together. In one passage (V. 62. 8) we are informed that in the morning at sunrise Mitra and Varuṇa look at Diti and Aditi in their golden chariot with golden spokes. In the other (IV. 2. 11) Agni is invoked to grant Diti (perhaps meaning a 'giver') and protect from Aditi (perhaps signifying a 'non-giver').

Diti is also mentioned with Aditi in Vājasaneyī Saṃhitā (15. 22) and Atharvaveda (XV. 18. 4; XVI. 6. 7). We also get the mention of Diti's sons in the Atharvaveda (VII. 7. 1) as the Daityas, who were regarded as the enemies of the gods.

The word *aditi* occurs about one hundred and forty times in the Rigveda. The term seems to refer to the goddess Aditi in more than hundred passages, where she has been invoked or incidentally mentioned either alone or with other deities. In the remaining passages the term has been used to qualify or mean some other deities. Thus in several passages it is made to qualify fire (as boundless or without limit or division) (I. 94. 5; II. 1. 11; IV. 1. 20; VIII. 19. 14) and Vivasvat (the sun) in one (VII. 9. 3). Again, Soma (the moon or the [illegible] plant) has been addressed as Aditi (VIII. 48. 2). The intoxication due to the drinking of soma juice has been said to be *aditi* (very intense) (V. 44. 11). Again, we have the phrase *aditi grāvāna* (V. 11. 5), which probably means a vast (widespread) cloud; probably the same significance is to be held in the phrase *aditeḥ vṛṣṇeḥ* (from the vast cloud) (X. 11. 1). Lastly, it seems to have been used for the earth and cow. In several passages (VII. 88. 7; IX. 26. 1; 69. 3; 71. 5; 74. 3, 5) we get the phrases *aditeḥ upastha*, *aditeḥ upasthāt* and *aditeḥ upasthe*, signifying 'on or over Aditi'. Sāyaṇa takes them to mean the earth (or the ground), but in all of them we may take *aditi* to mean the heaven as well. In another passage (V. 59. 8) we have the clause *mimātu dyauḥ aditi vitaye naḥ*—'let the boundless heaven bring forth (rains) for our nutrition'. In one place (IX. 96. 15) the term has been made to mean the 'cow' by Sāyaṇa, when Soma (the moon or the soma juice) has been compared with the refreshing *payaḥ* (the white light or the milk) drawn from Aditi (the heaven or the cow).

The goddess Aditi has been invoked alone more than sixty-five times, and some forty times with other deities in various combinations. Thus she was invoked, some thirty-eight times with Mitra and Varuṇa, some twenty-seven times with Dyau and the Earth, some twenty times with *Sindhu* (the river Indus), some twelve times with Aryaman and Indra, nine times with Bhaga, six times with Agni and Maruts, four times with Pūṣaṇ, Viṣṇu and Savitar, three times with Soma and Vāyu, twice with Rudras, Vasus and Brahmanaspati, and once with several other deities.

In the various passages devoted to Aditi, we find her qualified with a number of attributes. She has been called a goddess (*devī*) (V. 69. 3 ; VII. 38. 4 ; VIII. 18. 4 ; X. 10. 2 ; X. 36. 3 ; etc.), huge or vast in extent (*mahatī*) (I. 24. 1, 2 ; VIII. 25. 3), non-moving (that is, fixed and unchangeable) (*anarvā*) (II. 40. 6 ; VII. 40. 4 ; X. 92. 14), sinless (unchangeable) (*anāga*) (I. 24. 15 ; I. 162. 22), inaccessible (not liable to be injured—Sāyaṇa) (*anehasa*) (X. 63. 10), the mother (VIII. 25. 3), one with good sons (III. 4. 11), one with princely sons (II. 27. 7), all-spreading (*sarvatāti*, *uruvyacā*) (X. 100. 1 ; V. 46. 6), well-invoked (*suhavā*) (VII. 40. 4), provided with a good house (dome) (*suśarmā*) (X. 63. 10), without a second (unique) (VIII. 18. 6), provided with brightness (luminous bodies) (*ṛtāvati*) (VIII. 25. 3) and growing (or moving) with brightness (or brilliant bodies) (*ṛtāvṛdha*) (VII. 82. 10).

There are several other characteristics of Aditi. She is quick-moving (IV. 3. 8). She has been described as one not going backwards (X. 92. 14), where she has been prayed to with all the women (celestial goddesses). She has been called *adrivarhā*, pre-eminent or widespread like a cloud (X. 63. 3). She has, again, been represented as the heaven, the sky (*antaḥrīkṣa*), the mother, father and son, all the gods and the five places (of the Panjab) (I. 89. 10), evidently indicating that she practically pervades or covers everything ; she represents birth (probably the origin of the celestial beings) and is the cause of the birth (I. 89. 10). Again (I. 196. 6), she is called the sister, whereas the heaven is designated as the father, the earth as the mother and the Soma (the moon), as the brother. Aditi and the Ādityas (IV. 25. 3) have been begged for their brilliancy. Aditi protects the beasts both in the day and night.

There are several other facts regarding Aditi. The sage Śunaḥsepa said that may Agni release him in the vast Aditi, so that he may see the father and mother (heaven and earth) (I. 24. 1). According to the sage Dīrghatamas (I. 152. 6), Mitra and Varuṇa, travelling together, guard Aditi. Indra once spread over Aditi with his supremacy (VII. 18. 8). In one passage (X. 63. 2) the Visve Devas were invoked to come down on the earth from Aditi and the sky above. Dawn has been addressed as the mother of the gods and as the brilliancy of Aditi (I. 113. 19).

Lastly, we may consider a few other important passages regarding Aditi. First, we are told (X. 5. 7) that Agni is *asat* (non-existent—that is, without physical existence) and *sat* (existent); he is placed in the highest space (*parama vyome*) above Aditi, above Dakṣa. Secondly, in X. 72 we have a concise account of the creation of the universe. Brahmanaspati, like a blacksmith, created the Devas (luminaries) with blast and smelting. The existent came out of the non-existent before the time of the Devas (X. 72. 2). In the age of the Devas (that is, when they were created), the existent came out of the non-existent. Then *āśā* originated. Above it (arose) *uttānapad* (one with the legs spreading upwards) (X. 72. 3). From *uttānapad* arose *bhu*. From *bhu* arose *ūṣā*. From *aditi* arose *dakṣa*; again arose *aditi* from *dakṣa* (X. 72. 4). Oh *Dakṣa!* Aditi, who is your daughter, gave birth to (the Devas). The glorious Devas, held by indestructible ties, originated from her (X. 72. 5). The Devas, who remained in that space well bound down, threw hot (*tīvra*) particles, as if dancing like us (X. 72. 6). The Devas, who by stirring (agitation) pervaded the worlds, brought out the sun concealed in the ocean (X. 72. 7). Of the eight sons, born from the body of Aditi, she took away seven to the heavens and cast away *Mārtaṇḍa* (X. 72. 8). In the early age Aditi went with her seven sons and delivered Mārtaṇḍa for birth and death (X. 72. 9).

I shall now consider the sons of Aditi or Ādityas, as they have an important bearing on the determination of the physical nature of the deity. The following deities have been distinctly mentioned as the sons of Aditi. Mitra and Varuṇa (VI. 67. 4; VIII. 25. 3; X. 36. 3; X. 132. 6; X. 185. 3; etc.), Aryaman (VII. 60. 5; VIII. 47. 9), Bhaga (VII. 41. 2), Indra (IV. 18. 8) and Soma (IX. 69. 3). In one passage (X. 72. 8), we are informed that eight sons were born from Aditi. The number of Ādityas has been differently stated in the various hymns of the Rigveda, the number going up to twelve in the Puranas. The lowest number is found in II. 27, where we have the names of Mitra, Aryaman, Bhaga, Varuṇa, Dakṣa, and Aṃśa. The number has also been given as seven (IX. 114. 3), but no names are cited. Scattered throughout the Rigveda, we find the names of the following deities designated as Ādityas. Savitar (about eleven times), Mitra (about nine times), Varuṇa (about eight times), Aryaman (about eight times), Vasus (about eight times), Rudras (about six times), Indra (about five times), Maruts (about five times), Viṣṇu (about three times), Bhaga (about three times), Aśvins (twice), Ṛbhus (twice), Brahmaṇaspati (twice), Dakṣa (once), Aṃśa (once), Agni (once), Vāyu (once), Pūṣan (once), Sūrya (once), Bṛhaspati (once), Apaḥ (once), Parvata (?) (once), and Viśvadevas (once).

The lowest number of Ādityas in the Brāhmaṇas is given as seven, as in Śatapatha Brāhmaṇa (3. 1–3. 3) and Tāṇḍya Brāhmaṇa (23. 15. 3). Again, we have the number eight in Śatapatha Brāhmaṇa (3. 1. 3. 3), Tāṇḍya Brāhmaṇa (24. 12. 4), and Taittiriya Brāhmaṇa (2. 6. 19. 1-2). Śatapatha Brāhmaṇa and Tāṇḍya Brāhmaṇa repeat the sense of the passage X. 72. 8 of the Rigveda. The names given are Mitra, Varuṇa, Dhātar, Aryaman, Bhaga, Aṃśa, Candra (in Tāṇḍya Brāhmaṇa) or Indra (in Taitt. Br.), and Vivasvat. Lastly, in Śatapatha Brāhmaṇa (11. 6. 3. 8), the twelve months of the year are considered as Ādityas.

Again, in Śatapatha Brāhmaṇa (2. 2. 3. 9) the sun (as an Āditya) has been said to comprise all the (five) seasons: as he rises, it is (represents) spring; as he is higher up, it is summer; it is rainy season in the midday; it is autumn in the afternoon; and it is *hemanta* as he sets.

In Talavakāropaniṣad Brāhmaṇa (4. 5. 1-3), we have a list of deities, evidently the Ādityas, with the parts of the day and night over which they preside. Savitar in the morning; Viṣṇu before sunrise; Indra (Maghavendra Vaikuṇṭha) in the forenoon; Bhaga in the midday; Ugradeva (Rudra) in the afternoon; Yama in the reddening (of the sky) in the sunset; Soma in the darkness (evening); Pitar at night, entering (or pervading) persons in dreams and the beasts by water; Bhava in the depth of night (midnight), Angiras (Agnihotra) at the end of the night after Bhava, and Bhṛgu at the beginning of the (next) day. Again, in another place (4. 10. 10), we are told that Indra (Vaimṛdha) is at the sunrise, Savitar after sunrise, Mitra at the forenoon, Indra (Vaikuṇṭha) at midday, Śarva Ugradeva (Rudra) in the afternoon with reddening (of the sky) and Prajāpati at the sunset. In Bṛhadāraṇyaka Upaniṣad (3. 9. 5), the twelve months have been considered as the Ādityas of the *saṃvatsara* (year).

In Mahābhārata, we have the mention of twelve Ādityas, but the names enumerated are somewhat different in different places, so that the number of Ādityas becomes more than twelve in all. Taking them together, we find that the following deities were considered as Ādityas: Dhātṛ, Mitra, Varuṇa, Aryaman, Indra (Śakra), Aṃśa, Bhaga, Vivasvat, Pūṣan, Savitṛ, Tvaṣṭṛ, Viṣṇu, Parjanya, and Manu.

In Viṣṇupurāṇa (I. 15. 90) the eight Ādityas have been thus enumerated: Viṣṇu, Śakra, Vivasvat, Savitṛ, Mitra, Varuṇa, Aṃśa, and Bhaga. This, no doubt, refers to the earlier counting. In many Purānas we are told (as already indicated in Bṛhadāraṇyaka Upaniṣad) that the twelve Ādityas make their appearance in the twelve months (of a year), one in each month. They are thus enumerated: Vivasvat, Aryaman, Pūṣan, Tvaṣṭṛ, Savitṛ, Bhaga, Dhātṛ, Vidhātṛ, Varuṇa, Mitra, Śakra, and Ūrukrama.

In Nirukta (1. 15. 9) we are told that Aditi is all-in-all (*sarvam*) and that she is the heaven and the sky. Again, the term *aditi* is also a synonym of the earth (2. 5. 1), speech (*vāc*) (2. 23. 1), cow (3. 9. 11), and *Dyāvāpṛthivī* (heaven and earth) (3. 21. 7); she has also been called the mother of the Devas

(4. 22. 1; 11. 22. 1), the daughter of Dakṣa (11. 23. 3) and Agni (II. 23. 5).

As regards the significance of the two terms, *diti* is derived from the root *dit*, to bind, to divide or to cut. Hence it means one which is bounded, limited or divided; whereas *aditi* means boundless, unlimited or intact.

Let us now consider the views of the oriental scholars. Roth considers Diti and Aditi of V. 62. 8 as 'the eternal and the perishable' and Muir as 'the entire aggregate of visible nature'. Sāyaṇa has considered them as the indivisible earth and the separate creatures on it. In one other place (IV. 2. 11) where the two terms are mentioned together, they do not seem to refer to the two goddesses in question, but rather means a 'giver' and 'non-giver' as explained by Sāyaṇa and followed by Macdonell (Vedic Mythology, p. 123). Roth interprets them as 'wealth and penury'. As regards Aditi, Max Müller regards her to represent 'the visible infinite, visible by the naked eye, the endless expanse, beyond the earth, beyond the clouds, beyond the sky (Rigveda, translation, I. p. 230). Roth at first considered her to mean 'inviolability, imperishableness' and later on as the goddess of 'eternity', the principle which sustains the Ādityas, or imperishable celestial light. Pischel and Hardy take her to represent the earth. Colinet considers her as the female counterpart of Dyaus. Macdonell discusses at length (Vedic Mythology, p. 122) the nature of the goddess Aditi. He considers the two characteristics, or at least the only prominent ones, of Aditi are her motherhood and 'her power of releasing from the bonds of physical suffering and moral guilt' (also accepted by Wallis and Oldenberg). He suggests that the term *aditi* in the phrases *aditeḥ putrāḥ*, sons of Aditi, might have originally meant 'freedom' and ultimately led to the idea of motherhood. He cites, as examples, the terms *śavasaḥ*, son of might, and *Śacipati*, lord of might. I am, however, more inclined to think that the idea was originally that of a vast boundless space on which the stars and other luminous bodies were distributed and hence taken to be her sons, or that the wide distribution of the celestial bodies on the firmament led to the idea of a vast boundless space on which they are scattered or held together. As regards the second characteristic, namely the power of releasing from the bonds of physical suffering and moral guilt, we do not find that the attribute is solely confined to Aditi, for the same attribute, more or less in the same form, has also been assigned to many other deities who have been invoked for such relief.

I shall now express my own views of the physical nature of Diti and Aditi—as Vedic deities, and omitting the other significances in which the terms have been used.

First, regarding Aditi. We know that a number of stars form an asterism or *nakṣatra;* and twenty-seven (formerly twenty-eight) nakṣatras comprise the Zodiacal circle of 360°. This circle extends north and south of the ecliptic for a few degrees. In the ancient astronomical treatises, viz., Ārca-jyotiṣa (AJ [1]), Yājuṣa-jyotiṣa (YJ), Pitāmaha-siddhānta (PS), Vṛddhavāsiṣṭha-siddhānta (VS), Brahma-siddhānta (BS), Soma-siddhānta (SS), and Sūrya-siddhānta (SuS), we find the names of certain deities (most of which have been included in the list of Ādityas) connected with the asterisms. In the first two treatises we find the names of deities (or one or more syllables of their names) used in place of the usual names of the asterisms, or else the deities have been called the presiding gods of the asterisms. In the other works we find the names of the deities in place of the asterisms. We append below two lists, one of the deities with the asterisms arranged in an alphabetic order and another of the asterisms with their presiding gods in a serial order.

1. *List of Deities with their connected asterisms.*

Agni, lord of Kṛttikā (Junction star Alcyon): AJ. 25, YJ. 32 (as lord of the asterism); VS. 8. 7 (Agni in place of the name Kṛttikā); SS. 4. 6. 7.; 4. 6. 34 (Āgneya in place of the name Kṛttikā); SuS. 8. 18.

Aja Ekapāt, lord of Pūrvaproṣṭhapada (or Pūrvabhādra-pada) (Junction star α Pegasi): AJ. 9 (Aja for the asterism), 14 (the abbreviation *ja* for the asterism), 27 (as the presiding deity of the asterism); YJ. 10, 18, 34; PS. (Aja for the asterism); VS. 8. 8 (Ajapada for the asterism).

Aditi or Āditya, lady or lord of Punarvasu (Junction star Pollux): AJ. 25, YJ. 32 (as lord of the asterism); VS. 8. 18 (called Aditi); SS. 4. 6. 35 (called Āditya); SuS. 8. 19.

Aryaman, lord of Uttaraphālguni (Junction star β Leonis): AJ. 14 (abbreviation *mā* for the asterism), 27 (as the presiding deity); YJ. 18, 32; PS. (called Aryamā); VS. 8. 18 (called Aryamā).

Aśvins, lord of Aśvinī (Junction star α, β or γ Arietis): AJ. 14 (the abbreviation *jyau* for the asterism), 27 (as the presiding deity of the asterism); YJ. 18, 34; VS. 8. 19 (*Dasra* in place of the name of the asterism).

Ahirbudhna, lord of Uttarabhādrapada (Junction star α Andromedæ or β Pegasi): AJ. 14 (the abbreviation *hir* for the asterism), 27 (as the presiding deity); YJ. 18, 34; PS. (asterism called Ahirbudhna); VS. 8. 18 (asterism called Ahirbudhna).

Āpaḥ, lord of Pūrvāṣāḍhā (Junction star δ Sagittarius): AJ. 9 (asterism named *jalaḥ*), 14 (the abbreviation *pa* for the asterism), 26 (as the presiding deity); YJ. 10, 18, 33; PS.

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[1] Abbreviations used in the list of Deities.

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(asterism Āpa); BS. 2–178; SS. 4. 6. 4, 12; SuS. 8. 21 (called Āpa in all the three works).

Indra, lord of Jyeṣṭhā (Junction star Antares): AJ. 26. YJ. 33 (as the presiding deity); PS. (asterism called Indra).

Indrāgni, lord of Viśākhā (Junction star α Libera): A.J. 26, YJ. 33 (as the presiding deity of the asterism).

Tvaṣṭṛ, lord of Citrā (Junction star Spica): AJ. 9 (asterism called Tvaṣṭā), 26 (as the presiding deity); YJ. 10, 33.

Dhātṛ (called Yama by Somākara, the commentator on Yājusajyotiṣa), lord of Uttaraphālguni (Junction star β Leonis): AJ. 9; YJ. 10.

Nirti, lord of Mūlā (Junction star λ Scorpionis): AJ. 26, YJ. 33 (as the presiding deity).

Pitaraḥ, lords of Maghā (Junction star Regulus): AJ. 25; YJ. 32 (as the presiding deity of the asterism); VS. 8. 21; SS. 4. 6. 34; SuS. 8. 18 (called Pitṛ in the last three treatises).

Pūṣan, lord of Revati (Junction star ξ Piscium): AJ. 27 (as the presiding deity); YJ. 34; SS., SuS. Pauṣṇa.

Prajāpati (or Kaḥ), lord of Rohiṇī (Junction star Aldebaran): AJ. 25 (as the presiding deity); YJ. 32; VS. 8. 11; BS. 2. 176; SS. 4. 6. 11; SuS. 8. 20 (asterism named Prajāpati in the last four works).

Bhaga, lord of Pūrva-phālgunī (Junction star δ Leonis): AJ. 14 (*ga* as the abbreviation), 25; YJ. 18, 32 (as the presiding deity); PS. (asterism called Bhāgya); VS. 8. 8, 18 (asterism called Bhaga).

Mitra, lord of Anurādhā (Junction star β or δ Scorpionis): AJ. 9 (asterism called Mitra), 26 (as the presiding deity); PS. (asterism called Maitra); SS. 4. 6; SuS. 8. 18 (also called Maitra in the last two works).

Yama, lord of Bharaṇī (Junction star 35 Arietis): AJ. 27 (as the presiding deity); YJ. 34; SS. 4. 6. 9 (called Yamalā).

Rudra (or Bhava), lord of Ārdrā (Junction star α Orionis): AJ. 9 (called Bhava), 25 (Rudra as the presiding deity); YJ. 10, 32; SS. 4. 6. 7 (called Rudra).

Varuṇa, lord of Śatabhiṣā (Junction star λ Aquarii): AJ. 27 (as the presiding deity); YJ. 38; PS.; VS. 2. 174 (Vāruṇa in the last two works).

Vasus, lords of Dhaniṣṭhā (Junction star α or β Delphini): AJ. 9 (called Vasu), 27 (as the presiding deity); YJ. 10, 34.

Vāyu, lord of Svātī (Junction star Arcturus): AJ. 26 (as the presiding deity); YJ. 33; BS. 2. 167.

Viṣṇu, lord of Śravaṇā (Junction star Altair): AJ. 27 (as the presiding deity); YJ. 34; BS. 2. 179, 180 (the asterism or perhaps Altair is called Viṣṇutārā).

Viśve Devāḥ, lords of Uttarāṣāḍhā (Junction star φ or τ Sagittarius): AJ. 14 (*Śve* as the abbreviation of the name), 26 (as the presiding deity); YJ. 18, 33; PS. (called Vaiśvadeva); SS. 4. 6. 4 (called Vaiśva).

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Bṛhaspati, lord of Pūṣyā (Junction star δ Canceri): AJ. 25 (the presiding deity); YJ. 32; SS. 4. 6. 34; SuS. 8. 18 (Bārhaspatya in SS. and SuS.).

Savitṛ, lord of Hastā (Junction star γ or δ Corvi): AJ. 26 (the presiding deity); YJ. 33.

Soma, lord of Mṛgaśirā (Junction star λ Orionis): AJ. 26, YJ. 32 (the presiding deity).

2. *List of the Nakṣatras with their presiding Deities.*

(1) Aśvinī [also named Dasra (VS)]; abbreviation *jyau* (AJ., YJ.). Presiding deities the Aśvins.

(2) Bharaṇi (also called Yamalā). Presiding deity Yama.

(3) Kṛttikā (also called Agni, Āgneya). Pr. d. Agni.

(4) Rohiṇī (also called Prajāpati). Pr. d. Prajāpati (Kaḥ).

(5) Mṛgaśirā. Pr. d. Soma.

(6) Ārdrā (also called Bhava, Rudra). Pr. d. Rudra.

(7) Punarvasu (also called Aditi, Āditya). Pr. d. Aditi (or Āditya).

(8) Pūṣyā (also called Bārhaspatya). Pr. d. Bṛhaspati.

(9) Aśleṣā (also called Sarpa).

(10) Maghā (also called Pitar). Pr. d. Pitaraḥ.

(11) Pūrva-phālgunī (also called Bhaga, Bhāgya, *ga* as abbreviation). Pr. d. Bhaga.

(12) Uttara-phālgunī (also called Dhātār in AJ. and YJ., Aryamā). Pr. d. Aryaman.

(13) Hastā. Pr. d. Savitṛ.

(14) Citrā. Pr. d. Tvastṛ.

(15) Svātī. Pr. d. Vāyu.

(16) Viśākhā. Pr. d. Indrāgni.

(17) Anurādhā (also called Mitra, Maitra). Pr. d. Mitra.

(18) Jyeṣṭhā (also called Indra). Pr. d. Indra.

(19) Mūlā. Pr. d. Nirṛti.

(20) Pūrvāṣāḍhā (also called Āpa, Jala, *pa* as an abbreviation). Pr. d. Āpa.

(21) Uttarāṣāḍhā (also called Vaiśva, Vaiśva Deva; *śve* as an abbreviation). Pr. d. Viśve Devāh.

(22) Śravaṇā. Pr. d. Viṣṇu.

(23) Dhaniṣṭhā (also called Vasu). Pr. d. Vasus.

(24) Śatabhiṣā (also called Vāruṇa). Pr. d. Varuṇa.

(25) Pūrva-bhādrapada (also called Aja, Ajapada), *ja* as an abbreviation). Pr. d. Aja Ekapād.

(26) Uttara-bhādrapada (also called Ahirbudhna, Āhirbudhna, *hir* as an abbreviation). Pr. d. Ahirbudhna.

(27) Revatī (also called Pauṣṇa). Pr. d. Pūṣan.

From the above two lists we may conclude that most of the asterisms at an early period were known by names assigned to what became their presiding deities. Further, the significance of the names of and the various attributes assigned to these deities may be supposed to have been derived from the various physical phenomena observed by the Vedic sages and correlated with the rising of groups of stars or asterisms, perhaps at dawn. As more and more of the asterisms came to be recognized, more and more deities were created and named after the physical phenomena noticed with their risings. Hence we may reasonably suppose that the Ādityas, or most of them at least, represented a group of stars or asterisms, including as well the large luminous bodies, as the sun and the moon. We may thus account for the gradual increase of their number, even exceeding twelve and reaching nearly the number of the nakṣatras. Thus, the Ādityas are ultimately to be taken as the luminous bodies of the heaven. Considering that some of the Ādityas recognized at an early period were called the sons of Aditi and others, by their name, signify (luminous) bodies situated on (or pertaining to) Aditi, we may take Aditi to represent the celestial dome (sphere) studded with stars. Lastly, taking Diti as the counterpart of Aditi, that the Ādityas are all confined to the Zodiac and the northern hemisphere and that the Ādityas are opposed (as enemies) to the Daityas, we may take *Aditi to represent the northern hemisphere and the Zodiacal signs* (the part of the heaven which could be seen from the latitude of the North-West India throughout the year) and *Diti to represent the* limited, visible portion of the *southern hemisphere* of the heaven.

All the characteristics of Aditi can be well interpreted if we take this view. Her quick and not-going-backward movement indicates the apparent rotation of the celestial sphere from east to west round the axis passing through the poles. The direction of the movement never changes.

In conclusion, we may consider a few passages dealing with the creation of the sun and other luminous celestial bodies. Here the term *aditi* seems to have been used in different senses, but perhaps still keeping to the idea of vastness (of space). We shall, here, try with reserve to interpret the meanings of the words used in this connection. The origin of the existent (*sat*) from the non-existent (*asat*) seems to be the first step in the creation. It perhaps points to the early philosophical conception of the origin of the universe. *Āśā* seems to represent the wide unfathomable space (perhaps beyond human conception). *Uttānapād* is certainly not the same of the Pauranic or later literature and identified with β Ursæ minoris by Roth (in his *Wörterbuch*); it probably represents (so far as we can surmise from the significance of the term) the higher layers of space now less boundless (or more circumscribed). *Bhū* seems to indicate a space the existence of which can be well conceived in our mind (probably corresponding to the *ether* of modern science). The second *āśā*, arising from *bhū*, seems to indicate a space which can be determined by our senses. It seems to be identical with the first *aditi* from which *dakṣa* had his origin. So far as we can interpret the significance of *dakṣa*, it seems to indicate the space where energy (perhaps in the form of luminous particles) has appeared. The second *aditi* arising from *dakṣa*, seems to be the one widely recognized by the Vedic sages; she has given origin to the Ādityas (the luminous bodies). Here we should take her to represent the whole celestial sphere (as the counterpart Diti does not seem to have been taken into account). We further see that the Pauranik Dakṣa takes the place of the second *aditi* and represents the celestial sphere, his daughters representing the lunar mansions and the constellations of the northern hemisphere. A scholar named Binod Bihari Ray, in his work 'The Universe', has interpreted these passages in the light of the five physical elements—earth (*kṣiti*), water (*ap*), fire (*tejaḥ*), air (*marut*), and sky (*vyoma*). He takes *āśā* for the sky, *uttānapad* for air, *bhū* for tejaḥ, *dakṣa* for water, and *aditi* for earth (solid matter). Although the idea of creation from the five physical elements was in vogue at a later period, we cannot apply the same idea here, the great drawback being the six elements we have here in place of five. Thus the present hypothesis of the creation of the universe is different from that developed at a much later period.

III. CELESTIAL EQUATOR. EQUINOXES AND SOLSTICES. SUN'S NORTHWARD AND DOWNWARD SHIFTING IN A YEAR.

1. *Trita and Viśvarūpa.*

Trita.—Trita is a minor deity of Rigveda. No particular hymns are dedicated to him; but he is mentioned incidentally in some twenty-nine hymns, where his name is scattered through different passages (*ṛks*).

He is sometimes called by the name of *Trita Āptya* (Trita of the waters) or only by the name of *Āptya* (I. 105. 9; V. 41. 9; VIII. 47. 14; X. 8. 8). Again we get the mention of a sage named *Trita Vaibhuvasaḥ* (X. 46. 3) who is said to have obtained fire on the ground. In many places (X. 46. 6; X. 115. 4; etc.), Agni has been qualified as *trita*, that is, with three forms. *Trita Āptya* also appears in the personification of a sage and several hymns are assigned to him (I. 105; VIII. 47; IX. 33-4; 102; X. 1–7).

Trita is associated or mentioned with several other deities. He is closely associated with Indra, and we shall study this association later. He is closely related to Soma; we shall follow the relationship in connection with Trita's works. Trita is connected with Agni (celestial fire—the sun?) in several ways, which we shall discuss below. Trita is mentioned with the Maruts (II. 34. 10; V. 54. 2; VIII. 7. 24; etc.). We are told that the Maruts killed the enemies of Trita (II. 34. 10). When the Maruts, having harnessed their steeds, traverse every place and meet the lightening, Trita roars and widespread showers of rain fall to the ground (V: 54. 2). Further, the Maruts preserved the strength of Trita (VIII. 7. 24). Trita is further mentioned as holding Varuṇa in the sea (IX. 95. 4). Lastly, we find that the Vāyus (winds) asked the help of Trita (X. 115. 4).

We do not find any suggestions or statements regarding his physical characteristics. We are told of his iron-pointed shaft (X. 99. 6) and his arrows (II. 11. 20); we are also told that he slew Viśvarūpa with his weapons (X. 8. 8). Trita has been praised as a raingiver, as one like the womb of the firmament, and as the grandson of waters. All we know about the place of Trita is that his abode is secret (IX. 102. 2) and is in the heaven (V. 9. 5; V. 41. 4).

We now consider the works attributed to Trita. Firstly, the slaying of Vṛtra. He is closely associated with Indra in his work. He cleft the joints of Vṛtra by the strength of the food (the Soma beverage) (I. 187. 1). Again we are told that he helped Indra in his fight with Vṛtra and in giving this assistance he was further aided by the Maruts (VIII. 7. 24). Further Indra seized the cows from Ahi and gave them to Trita (X. 48. 2). Ahi seems to be identical with Vṛtra. In this conflict with Vṛtra, Indra acted according to the will of Trita (VIII. 52. 1). Secondly, the slaying of Viśvarūpa. Urged by Indra and knowing his paternal weapons Trita slew Viśvarūpa, the three-headed, seven-rayed son of Tvaṣṭṛ (X. 8. 8). Viśvarūpa was delivered by Indra to Trita (II. 11. 19). The same feat is also attributed to Indra himself elsewhere (II. 11. 19; X. 8, 9). Indra, while subduing the Dāsa, also subdued the three-headed six-eyed; Trita, empowered by the vigour of Indra, killed the boar by his finger-tips which are as sharp as the iron (the iron-tipped shaft) (X. 99. 6). Thirdly, the breaking of the fence (*paridhi*) of Vala. Trita cleft the fence (*paridhi*) of Vala (I. 52. 4, 5). Again we are told that Indra strengthened by the Soma-pressing Trita, possessed of good arrows, cast down Arbuda and with the Agnirasas rent Vala (II. 11. 20). Fourthly, Trita's work in connection with Soma. We are informed of Trita as a preparer of Soma (II. 11. 20; IX. 32. 2; IX. 38. 2; etc.) and as a purifier of the same (IX. 34. 4). Trita's maidens (fingers according to Sayana) urge the tawny-coloured Soma-juice with the stones for Indra (IX. 32. 2; IX. 38. 2). Trita becomes drunk with Soma-juice (VIII. 12, 16). In this connection we should note a few passages on Soma. Soma lies in the secret place near the two pressing stones of Trita (IX. 102. 2). Soma caused the sun along with the sisters (*jāmiviḥ*; or by growth, by increase in strength) to shine on the top of Trita (IX. 37. 4). Soma placed in Trita nourishes Indra situated in the sky (IX. 95. 4). Again we are told that (as if) Soma has created the name of Trita (IX. 86. 20). Indra drank Soma beside Manu, Vivasvat, and Trita (Vālakhilya 4. 1). Fifthly, we are told that Trita harnessed a steed given by Yama; Indra mounted the steed first. This steed was united with Yama, Āditya, and Trita by a secret operation. Sixthly, Trita blows upon the rising flame of Agni like a smelter and sharpens (strengthens) him as in a smelting furnace (V. 9. 5). Trita, eagerly seeking Agni, found him on the head of the cow. Trita surrounded by flames seated himself within his place (X. 46. 3, 6).

We are also informed of several other facts about Trita. First, Trita fell into a well and prayed to the gods for help; Bṛhaspati released him (I. 105. 17). While within the pit, Trita prayed to his father and went forth claiming his paternal weapons (X. 8. 7) with which he fought with Viśvarūpa. Secondly, Trita, to gain his ends, turned round the five principal hotṛs together by his circle (*Cakra*). Thirdly, Trita knows the existence of the seven rays to which his navel is extended (connected) and was praying to them to get out of the pit (I. 105. 9). Fourthly, the horse killed in the horse-sacrifice is said to stay with Yama, Āditya, and Trita (I. 163. 3). This horse is said to be tied to heaven in three places. Fifthly, Ādityas and Ūṣās are prayed to transfer ill deeds and evil dreams to Trita (VIII. 47. 13–17); such an idea is also suggested vaguely in Atharvaveda, where it is mentioned that the guilt or dream is transferred to Trita.

Trita is also mentioned in other Vedic literatures. In Taittirīya Saṃhitā (I. 8, 10. 2), Trita is considered to be the bestower of long life. We find this mentioned in several other treatises in association with Ekata and Dvita, as noted below.

The three deities, Ekata, Dvita, and Trita are closely associated. We do not find the word Ekata in the Rigveda, but the term Dvita occurs in the Rigveda as the name of a sage who is called Dvita Aptya (IX. 103). There is another sage who has been called Dvita Mṛktavāhā of Atri family (V. 18). All the three names, Ekata, Dvita, and Trita are found together in Taittiriya Saṃhitā (I. 8, 10. 2), Vājasaneyi Saṃhitā (I. 23), Taittiriya Brāhmaṇa (III. 2, 8, 10-11), and Śatapatha Brāhmaṇa (I. 2, 3. 1). Sayana, in his Introduction to Rigveda I. 105, says that, according to the Sāṭyānas, Ekata, Dvita, and Trita were in ancient times three sages; once upon a time they were in a desert and having felt thirsty came to a well. Trita entered into the well to drink the water and also brought water out of the well for the other two. These two sages, after they have had drunk the water, seized the money of Trita, threw him into the well, covered the mouth of the well with the wheel of a chariot, and went away. Trita prayed to the gods in his mind to get him out of the well. Having seen the moonlight inside the well at night, he worshipped the gods. Yāska in his Nirukta (IV. 6) explains the word *trita* as meaning 'very proficient in wisdom' and as a numeral referring to one of the three brothers, Ekata, Dvita, and Trita. In another place (IX. 25) he considers Trita as 'Indra in three abodes' (that is, heaven, earth, and air). Lastly, we have the mention of three deities in Mahābhārata (XII, 12,772), where they are called the desired (*mānasa*) sons of Brahmā.

We have references to Trita in the Avesta, where he appears as Thrita and Thraetaona, perhaps as two distinct persons (?). Thrita (Yasna IX) was the third person in the corporeal world who prepared Haoma (Soma), the others being Vivanhvant (Vivāsvat) the first, Āthwya (Āptya) the second, and Pourushāspa (Parucchepa ?) the fourth. Thrita had two sons (Vendidad I. 68, 69). Thraetaona was born to help Varina (Varuṇa ?) with four corners and killed the serpent Dahāka (Dāsa). In another place (Khorda Avesta XXI, 33), Thraetaona is mentioned as Varena, the four-cornered. The Dahāka (Khorda Avesta XXI.

34), the snake, has three jaws, six strong eyes, and of thousand-fold strength.

Viśvarūpa. The word occurs some twenty times in the Rigveda. Except in four passages (II. 11, 19; X. 8, 8-9; X. 99. 6.), the term has been used to qualify various deities (as, the Sun, the Maruts, Tvaṣṭṛ, Bṛhaspati, etc.) and perhaps means 'omniform' or 'having the sum-total of the world's beauty'. In the above-mentioned four passages we have the indication of a story in which Viśvarūpa appears with a distinct personality.

Viśvarūpa is the son of Tvaṣṭṛ (II. 11, 19). He had three heads (X. 8. 8; X. 99. 6), six eyes (X. 99. 6), and seven rays (X. 8. 8).

We are informed of the conflict between Viśvarūpa on one side and Indra and Trita on the other. Indra killed Viśvarūpa to gain the friendship of Trita (II. 11, 19). In another place we are told that Indra raised a loud noise around the cattle of Viśvarūpa and cut down the demon's head looking upwards and full of glory and valour. His three heads hang down. Again we are told (X. 99. 6) that Indra struck the roaring demon (*dāsa*) and to subdue the three-headed and six-eyed one, lent his might to Trita who tore the boar into pieces with his sharp-nailed fingers. Lastly (X. 8. 8), we are informed that Trita Āptya, sent by Indra, killed the three-headed, seven-rayed one.

The above-mentioned story has been much expanded in Taittiriya Saṃhitā (II. 5. 1), Maitrāyaṇī Saṃhitā (II. 4. 1), Kāṭhaka Saṃhitā (XII. 10), and Śatapatha Brāhmaṇa (I. 2, 3. 2; I. 6. 3. 1–5; V. 5. 4. 2–6). The bodily characteristics of Viśvarūpa have also been described in the last-named work (I. 7. 3. 1; V. 5. 4. 2) as having three heads, six eyes, three faces, and similar (that is, similarly peculiar) form. Of the three heads of Viśvarūpa, one used to drink Sóma, one wine, and one used to eat food. When Indra cut off the three heads, the first one became a hazelcock, the second a sparrow, and the third a partridge.

I shall now deal with the views of oriental scholars on the physical nature of Trita and Viśvarūpa.

Macdonell (*Journ. Royal Asiatic Soc.* for 1893, pp. 419–496; *Vedic Mythology*, p. 69) has discussed at length the views of various scholars and has advanced one of his own. We may briefly enumerate them here. A. Kuhn (1846), depending upon a small portion of the Rigveda then published, thought that Trita was identical with Indra. Roth (1848) came to the conclusion that Trita is a water and wind (*Vāyu*) god. Myrianthus (1876) thought Trita and his successor Indra to be 'a designation of the sky'. Ludwig was inclined to identify Trita with Vāyu and sometimes with Soma. Bergaigne identified Trita in his origin partly with the celestial Agni and partly with the celestial Soma. Pischel at first thought that Trita was a god of the sea and waters; later he took Trita to be originally a human healer who was subsequently deified. Hillebrandt regarded Trita as a deity of the bright sky. Perry believed him to be a god of the storm, older than Indra. Hardy took him to be a moon-god. Macdonell regarded Trita as the god of lightening or 'the aerial form of fire, originally the middle member of the triad Agni, Vāyu or Indra, Sūrya. Plunket (*Ancient Calendars and Constellations*, pp. 176-7) regarded Trita as a 'personification of the third of the moon's course through the constellations of the Zodiac at the season of the summer solstice (in Aquarius or in Piscis, sometimes indeed at the junction of these constellations)'.

Coming to Viśvarūpa we find that Kālinath Mukherji is his *Popular Hindu Astronomy*, pp. 125, 139, suggested that Viśvarūpa is the constellation Orion (Kāla-puruṣa). He regarded the three prominent stars in the head of the Orion as the three heads of Viśvarūpa.

I shall now discuss the physical nature of Trita and Viśvarūpa and shall express my own views. We find that the latter has been described as a serpent with three heads, six eyes, seven rays, and of thousandfold strength (in the Avesta and Rigveda). Hence we cannot identify him with Orion. We know that from ancient times a large snake-like constellation figure has been recognised on the south of the ecliptic (the sun's apparent circular path in the heaven) sweeping over nearly one-fourth the entire circle of the heaven and lying beneath the Zodiacal constellations Cancer, Leo, and Virgo. This is named *Hydra*. The posterior part of its body lies beneath *Citrā* (Spica), the presiding deity of which is Tvaṣṭṛ, the father of Viśvarūpa. The number of heads of the Hydra has been variously counted from 7, 9, several to 100, according to various records and legends (Brown's *Primitive Constellations*, Vol. I, pp. 104-5). It is the storm and ocean-monster of the ancients and has been also called the water-snake. From these evidences we are inclined to identify Viśvarūpa as the constellation Hydra.

Coming to Trita, we find that he is closely associated with Indra, Soma, Agni, Maruts, and Vāyu, and hence he cannot be identified with any of them. There is, however, sufficient evidence for the belief, already held by the oriental scholars, that some of the feats attributed to Trita in the Avesta and in the earlier hymns of the Rigveda have been transferred to Indra in the later hymns of the latter work and that Trita has been thrown into the background. That Trita is closely connected with the rains in the season of the summer solstice is clearly shown by his association with Indra (who is evidently the presiding deity of the summer solstice—Plunket, *Ancient Calendars and Constellations*, pp. 115) particularly in the slaying of Vṛtra (either a personification of the cloud, as held by most of the authorities, or the constellation *Hydra* according to

Plunket), Maruts and Vāyu, as well as with the thunderstorm and downpour of rains. Further, considering his abode in the heaven, the position of the sun on his top, and his slaying of Viśvarūpa (Hydra), we can definitely assign his place to that part of the heaven which lies beneath the summer solstice in the ecliptic in close connection with the Hydra. When one thinks of the three brothers, Ekata, Dvita, and Trita and of Trita's *cakra*, one is inclined to entertain the idea that they form together a complete circle, each representing its one-third. Taking into account the close connection of Trita with the rainy season and finding that he has two other brothers, I think it probable that the three brothers are in someway connected with three seasons, recognised in the early Vedic period. Plunket also holds the view that the three form a circle and he considers that Trita represents one-third of the circular path of the moon. Trita's close association with Soma (which he takes as the moon) has led Plunket to arrive at such a conclusion. But I am unable to adhere to his view and am led to the conclusion that Trita represents one-third part of the equator connected with and lying beneath the summer solstice for the following reasons: (i) Trita's slaying the Viśvarūpa. This is easily explained if we think that the equator was passing through the constellation figure Hydra. This actually happened sometime about 3000 B.C., when the equator passed through the neck of the figure. (ii) Trita's fall into a pit. This statement can be reconciled if we remember that half the equator is placed beneath (on the south of) that half of the ecliptic which has the summer solstice in the middle. This depression of the equator has been allegorically described as Trita's fall into a pit. Again all the statements concerning the close connection of Trita with Soma, on which Plunket has based his conclusion, can be reconciled for the following reason: The moon's orbit cuts the ecliptic at two points (spoken of as the *ascending* and *descending nodes*) and the plane of its orbit is inclined to the plane of the ecliptic at an angle of 5°8′ approximately. Again these two points are known to shift along the ecliptic and the plane of the moon's orbit is known to revolve so as to cover a complete circle of 360° in the course of $18\frac{2}{3}$ years. If we assume that, at the time of the observation, the moon's orbit was so placed between the ecliptic and equator towards the equinoctial point (perhaps autumnal equinox) that the moon in her path came close to the equation, we can interpret all the facts stated in the Rigveda on this point. The Soma-juice was evidently so correlated with the moon that what is Soma-juice to an earthly being is the moon (the celestial beverage) to the heavenly deities.

Macdonell's view that Trita is the god of lightening cannot be accepted for the same reasons as are cited above. Further we do not find any passage which directly connects him with lightening, although he is distinctly mentioned as the rain-giver ; he is connected in a general way to all the phenomena we see connected with the rains.

Some of the feats of Trita remain unexplained until we can find out the physical nature of the personalities connected with such feats.

2. *Mitra and Varuṇa.*

Mitra and Varuṇa, being closely associated in the Rigveda, are here considered together.

They are invoked together in some nineteen hymns and in about two hundred and thirteen passages in addition, with or without other deities. Mitra has been praised alone in a single hymn (III. 59) and with or without Varuṇa in about two hundred and forty-one passages. Varuṇa has been addressed alone in seven complete hymns and with Indra in seven complete and parts of two hymns. He has been altogether invoked about three hundred and fifteen times, with or without Mitra and other deities. Their wives are also mentioned in several passages (I. 22. 12 ; I. 109. 2). They are associated with Aryaman in a large number of passages.

There are many physical features attributed to Mitra and Varuṇa. They are visible (I. 38. 13 ; V. 65. 1), bright (I. 136. 4 ; II. 27. 2 ; V. 67. 1 ; VII. 66. 17 ; etc.), full of strength (III. 59. 8 ; VI. 48. 1 ; VII. 66. 2 ; etc.), producers of sound (X. 102. 7) and fire-tongued (VII. 66. 10). They are emperors (V. 63. 2, 3 ; VIII. 25. 4). Their brightness illuminates the heaven and earth and sky. They are unequal (*asama*) (VI. 67. 1).

We are informed of Varuṇa's traits. He is irritable (IV. 41. 4), orderly (*dhṛtavrata*) (I. 141. 9 ; II. 1. 4 ; etc.) and white in colour (VIII. 41. 9 ; etc.). We are told of Varuna's wrath (I. 24. 6 ; VII. 84. 2 ; etc.). Agni is invoked for relief from Varuṇa's wrath (IV. 1, 4) and from Varuṇa's mischief (I. 128. 7). Soma and Rudra have been invoked to save from Varuṇa's trap (VI. 74. 4). Varuṇa's garments are all golden (I. 25. 13). Varuṇa and Indra are friendly to each other (V. 41. 3).

Mitra and Varuṇa are Ādityas (I. 14. 3 ; II. 27. 2, 6 ; etc.) ; they are Aditi's sons (VIII. 25. 2 ; X. 36. 3) ; Aditi gave birth to them (VIII. 25. 3). Varuṇa has seven sisters, of whom he is in the middle (VIII. 41. 2 ; VIII. 59. 4). Vibhvā (one of the Ṛbhus) belongs to Varuṇa (IV. 33. 9). Varuṇa is Agni's brother and friend (IV. 1, 2, 3). Dawn is Varuṇa's sister (I. 123. 5). Varuṇa and the sun follow the regulations of Indra (I. 101. 3). We are told of Mitra and Varuṇa's messengers (VI. 67. 5 ; VII. 61. 3). Varuṇa's messengers sit down around him (I. 27. 13). Varuṇa's messengers are thousand-eyed (Atharvaveda IV. 16. 4). Varuṇa, again, is the horse of the sacrifice (I. 163. 4).

Mitra and Varuṇa always travel in the same chariot (V. 62. 2). They remain in the highest region in their chariot (V. 63. 1). Their chariot is golden with metallic pegs (V. 62. 8); it remains in the sky, shining like lightening (V. 62. 7). Varuṇa's steed is of a tawny colour (V. 62. 7).

Mitra and Varuṇa live in the heaven (I. 137. 1); their abode is old (VIII. 25. 17), golden (I. 136. 2.) and very lofty (VII. 88. 5); their house has a thousand doors (VII. 88. 5). The sun, rising from his place, goes to the abodes of Mitra and Varuṇa (I. 152. 4; VII. 60. 1, 3).

Let us now consider the usual works of Mitra and Varuṇa—(1) Mitra and Varuṇa, like several other deities, are closely connected with the heaven and earth and sky. They hold the three worlds (III. 59. 1; V. 69. 1; X. 132. 2; etc.). They have separately fixed the heaven and earth by their strength (VII. 61. 4). With Aryaman, they support the three grounds (three regions of the earth) and three (regions of the) heavens (II. 27. 8). Mitra and Varuṇa point out the path to the heaven (V. 64. 1). Varuṇa made the sky spread all round (V. 85. 2). Varuṇa has measured the extent of the earth (VIII. 42. 1). (2) Mitra and Varuṇa are the regulators of time. With Aryaman, they have established the autumn (year), month, and day and night (VII. 66. 11); with Indra and Agni, they originated the day (V. 49. 3). Dawn is, so to say, the lustre of Mitra and Varuṇa (III. 61. 7). Mitra destroys the darkness (I. 141. 9). Varuṇa knows the twelve months and knows how the months originate (I. 25. 8). Varuṇa makes his own lustre white and black (that is, originates the day and night) (VIII. 41. 10). He embraces the night (VIII. 41. 3). He makes three dawns grow (VIII. 41. 3). Everyday, the dawns are placed in front of the place of Varuṇa at a distance (the rate) of thirty yojanas (I. 123. 8). He speaks of twenty-one names of the cow (VII. 87. 4). (3) Mitra and Varuṇa are regarded as the givers of rain. They are lords of water (VII. 64. 1). They cover the mountains with clouds (V. 85. 4). They keep the sun hidden with cloud (V. 63. 4). They cause the downpour of rain (V. 63. 1; V. 68. 2, 5) and cause the rivers to flow (V. 62. 4). They soak the pasture grounds (VII. 62. 5). They make the annuals grow and fatten the cows (V. 62. 3). Indra's thunderbolt gives pleasure to Mitra and Varuṇa. Varuṇa, again, is regarded as the lord of water (VII. 49. 3). He is the originator of water (VII. 87. 6) and has distributed sky-born water to all (VII. 87. 1). Varuṇa has hundreds of thousands of medicinal herbs (I. 24. 9). He soaks all the grounds (V. 85. 3). Indra and Varuṇa fill up the dry rivers with water (VII. 82. 4). In one passage (V. 69. 2), three bright ones are said to be carriers of water (*retodhāḥ*) and givers of rain; they live in their own abodes. They seem to be Mitra, Indra, and Varuṇa. (4) Mitra and Varuṇa are closely connected to the sun. The sun is regarded as their eyes (VI. 51. 1; VII. 61. 1; X. 37. 1; etc.) as also representing the eyes of Mitra, Varuṇa, and Agni (I. 115. 1). Again, the sun is Varuṇa himself (I. 50. 6). The sun is their friend (I. 152. 4) and is as if it were their weapon (V. 63. 4). Mitra and Varuṇa exhibit their brightness in the sun's abode (VIII. 28. 19); they increase the sun's brightness (V. 62. 2). They hold the sun in the sky (V. 63. 7; V. 66. 2). The sun exhibits his bright form to make Mitra and Varuṇa visible (I. 115. 5). The sun's motion and setting are the works of Mitra and Varuṇa (III. 55. 6). When the sun rises in the morning, Mitra and Varuṇa, riding on their chariot, look at Diti and Aditi (V. 62. 8). Agni is called Mitra and Varuṇa (VI. 12. 3). Mitra and Varuṇa spread light all round (X. 31. 9). Again, Varuṇa is said to hold his brightness high up in the sky (I. 24. 7). He fashioned the sun for brightness (VII. 87. 5). Varuṇa surrounds his well-nourished body with golden garments and spreads his golden rays all round (I. 25. 13). Varuṇa arranged for the sun's path and separated the days and nights from one another (I. 24. 8; VII. 87. 1). Varuṇa, with Indra, made the sun move in the sky (VII. 82. 3). Lastly, Varuṇa measured the sky with the sun like a balance (V. 85. 5); he fashioned the sun in the sky for brightness, like a balance (VII. 87. 5). Viṣnu, again, is said to have his three steps by the laws of Mitra for Indra (VIII. 52. 3).

We should also consider some minor deeds of Mitra and Varuṇa. (1) They became four-cornered (provided with four weapons—Sāyaṇa) killed the three-cornered (three-weaponed) one (V. 152. 2). (2) Varuṇa holds the directions on the earth (VIII. 41. 2); he extends to (all) the directions (VIII. 41. 2). (3) It is by Varuṇa's order, that the moon shines at night (I. 24. 10). (4) Mitra and Varuṇa hold Dadhikrā (IV. 31. 2, 5).

Lastly, there are several myths connected with Mitra and Varuṇa. (1) They know the Aśvins (VI. 62. 9). (2) When Purukutsa, the son of Durgaha, was imprisoned (killed ?), the seven sages (*saptarṣis*) became the lords of the country. Purūkutsa's wife performed a sacrifice for Indra and Varuṇa and was gifted with a son, Trasadasyu (IV. 42. 8, 9). (3) When Śunaḥśepa was bound down to three wooden pillars, he prayed Varuṇa to release him by loosening the ties above, below and in the middle. He got free (I. 24. 13–15). There is a detailed account of Śunaḥśepa in Aitareya Brāhmana. (4) Mitra and Varuṇa, invoked in a sacrifice, placed their seminal fluid inside a pitcher; from inside this came out Māna (measure; Agastya, according to Sāyaṇa) and Vasiṣṭha was born (VII. 3. 13). The semen was taken in by Urvaśī who gave birth to Vasiṣṭha (VII. 33. 11, 12); Vasiṣṭha threw out light like lightening; Mitra and Varuṇa looked at him. Agastya also brought him from (his) place. He was then born (VII. 33. 9, 10). (5) There is another myth regarding Vasiṣṭha (VII. 88. 3, 4). Vasiṣṭha was compelled to go on a boat with Varuṇa. The boat was made to move on the sea (sky) during the day time by Varuṇa. Vasiṣṭha was happy on this boat-like swing. (6) When the king Sudāsa was attacked by ten aboriginal kings he defeated them with the help of Indra and Varuṇa (VII. 83. 7, 8).

Lastly, we find many requests to Mitra and Varuṇa. A few of these entreaties are of importance to us. They have been invoked for protection from great distress (*Vṛhadvarutha*) (VIII. 18. 20) and three distresses (*trivarutha*) (VIII. 18. 21). Indra and Varuṇa together have been invoked for progeny, fertile land, and long life (IV. 41. 6).

We find mention of Mitra and Varuṇa in the Brāhmaṇas. Opposing qualities have often been attributed to Mitra and Varuṇa: Mitra is right, Varuṇa left (Taitt. 1. 7. 10. 1); water (payaḥ) is Mitra's and Soma is Varuṇa's (Śatapath. 4. 1, 4, 9); Mitra is *prāṇa*, Varuṇa is *apāna* (Śatapath. 8. 4. 2, 6; etc.); Mitra is day, Varuṇa is night (Aitareya. 4, 10); and so on. Again, Varuṇa has been called the year (*sambatsara*) (Satapath. 4. 1, 4, 10).

In the ancient astronomical treatises, Mitra is regarded as the presiding deity of *Anurādhā nakṣatra* (Yajusa. 10, 33; Ārc. 10, 26; Soma-siddhānta 4. 6–34; Sūrya-siddhānta 8. 18) and Varuṇa is that of *Śatabhiṣā* (Yaj. 34; Ārc. 27; Brahma-siddhānta 2. 174; Pitāmaha-siddhanta). The *saptamī tithi* in connection with the *Śatabhiṣā nakṣatra* in the month of *Agrahāyaṇa* is recognised as *Mitra-saptamī*.

Mithras is the Iranian form of the Vedic Mitra (Plunket, p. 81). He was the sun-god of the Persians and his worship was introduced into Rome about the time of the fall of the Republic. The birthday of the sun-god was kept at the winter-solstice, but the great festivities in his honour were held at the season of the spring equinox. Mithras used to be represented in sculpture as thrusting his dagger into the neck of the mystic bull. Sometimes a scorpion was made to join with Mithras in his attack upon the Bull (Plunket, pp. 61–64).

Coming to the opinion of the Vedic scholars, we see that Mitra is regarded as 'a sun-god or a god of light specially connected with the sun' (Macdonell's *Vedic Mythology*, p. 30). The physical nature of Varuṇa has been discussed in *Vedic Mythology*, pp. 27-28. 'According to the generally received opinion', Varuṇa 'is the encompassing sky'. Varuṇa later on became the god of the sea. Oldenberg regarded Varuṇa as representing the moon, but this is not accepted by Macdonell.

I shall now set forth my own views on the physical basis of Mitra and Varuṇa. We have already obtained some evidence regarding the physical nature of Mitra from our knowledge of the Persian sun-god Mithras. His representation as killing the Bull with the help of Scorpion has already been interpreted as the sun-god coming in conjunction with the sign Taurus in the day time and at night by Scorpio, the constellation in opposition. 'This triumph of Mithras was associated traditionally—in Roman days it could only have been traditionally—with the occurrence, at a remote date, of the spring equinox during the time the sun was in conjunction with the constellation Taurus' (Plunket, p. 64). We have already seen that the birthday of Mithras used to be taken as the winter solstice during the Roman period. From our side, we see that the asterism Anurādhā, of whom Mitra is the presiding deity, is placed in the sign Scorpio. Again, the asterism Śatabhiṣā in the month of Agrahāyaṇa is dedicated to Mitra. Taking all these facts together we may take Mitra to be the presiding deity of the winter solstice or vernal equinox. Considering that dawn is the lustre of Mitra, that Mitra destroys the darkness, that Mitra increases the brightness of the sun, that Mitra can look at both Diti and Aditi, and that Viṣṇu had three steps by the laws of Mitra, I take Mitra to be connected with the vernal equinox. Further, in his many functions, Mitra is directly opposite to Varuṇa, who appears to be the presiding deity of the autumnal equinox. We find Varuṇa to be closely connected with water and to be associated with Indra. He is also closely connected with the sun. The great fact which reveals his true nature is that he swings the sun like a balance. This is very suggestive of the equinoctial point from which the sun is known to move on either side to the solstitial points. His opposite position and nature to Mitra and his special connection with water and the growth of herbs, make me believe that he really represents the autumnal equinox or its presiding deity. All the facts which we find in connection with Mitra and Varuṇa can be very well reconciled if we accept this view. Varuṇa's irritability may refer to the distress from flood in the autumn or to the trying moist heat at this period of the year. Varuṇa's messengers seem to be the clear sky studded with stars. The same chariot for them both evidently refers to the same position of the two equinoctial points. The progress of the dawns daily from the abode of Varuṇa at a distance of thirty yojanas has been explained by Sāyaṇa thus: The period of dawn is that when the stars cannot be seen and the sun has not risen. It extends from 21st to 26th hours. Varuṇa is the sun. Every day the sun moves round the meru by five thousand and fifty-nine yojanas. The dawns also go ahead by thirty yojanas and hence appear in places thirty yojanas distant in front of the sun. The passage might have indicated the increase of the duration of night by the receding of the dawn and the late rising of the sun. Mitra and Varuṇa's destroying the three-cornered one by a four-cornered may mean the recognition of the four equinoctial and solstitial points in place of the three seasonal periods or the three steps of the sun from the equinox to one solstice, one solstice to another and from the solstice back to the equinox again.

Mitra and Varuṇa's knowledge of the Aśvins may mean that the vernal equinox was placed on the asterism Aśvinī at that time. The seven sages becoming the lords of the country may mean that the *saptarṣi* (Great Bear) was nearest the polar star. This happened about 3000 B.C. The story of Śunaḥśepa may indicate that the precession of the equinoxes came to be known by the sages. Śunaḥśepa may be the personification of the obliquity of the ecliptic. The three pillars may be the two solstices at the sides (summer solstice higher up and winter solstice lower down) and the equinoctial points at the same place in the middle. Freeing Śunaḥśepa by Varuṇa may indicate that the movement of the ecliptic along the equator (rather that of the equator along the ecliptic), not known before, was now recognised, at the time of the autumnal equinox. In the myth of Vasiṣṭha, Vasiṣṭha is the sun. Urvaśī is the dawn. Agastya is the star Canopus. The boat seems to be the constellation Argo of which Canopus is the most brilliant star. The pitcher seems to be the constellation figure of Aquarius. Vasiṣṭha's birth appears to be the sunrise. The whole story thus refers to the heliacal rising of Canopus at the time of the vernal or autumnal equinox. In this connection we quote the following few lines from Plunket: 'the almost upright and symmetrical position of Argo 3000 B.C. may suggest the likelihood that at that date or perhaps a few hundred years later . . . this constellation was imagined. It will be observed that all the stars of Argo, even the bright and southern Canopus at 35°N., would have been above the horizon and visible at midnight of the winter solstice. At noon of the summer solstice they would have been above the horizon, but invisible in conjunction with the sun . . .'

3. *Indra.*

Indra is the most prominent of all the deities invoked by the Rigvedic sages. More than two hundred hymns have been dedicated to him. He is also addressed in parts of some fifty-five hymns. Further, he is mentioned in many passages that refer to other deities. Indra has been praised with Agni in eleven hymns, with Ṛbhus in one hymn, with Pūṣan in one hymn, with Bṛhaspati in five hymns, with Varuṇa in ten hymns, with Vāyu in five hymns, with Viṣṇu in three hymns, and with Soma in three hymns. He has been associated with the Maruts in a large number of passages.

We are informed of many of the physical features of Indra. He has a body, with head, arms, and hands (II. 16. 2; VIII. 85. 3). His belly has been many times referred to in connection with the drinking of Soma juice (II. 16. 2; etc.). He has two eyes (X. 96. 9). His jaw or nose has been mentioned (III. 32. 3); and he has often been called good-nosed (*suśipra*, I. 9. 3; śiprī, I. 81. 4; etc.). His arms are long, great and far-reaching (VI. 19. 3; VIII. 32. 10; etc.). He has tawny hair (X. 96. 3, 4; etc.) and a tawny beard (X. 96. 4). He has the most beautiful form and the ruddy brilliance of the sun (X. 112. 3). He is golden (I. 7. 2; VIII. 55. 3). He is seven-rayed (II. 12. 11) and is the lord of rays (III. 31. 4). These attributes also apply to the sun. In two hymns (II. 42, 43), the Francoline partridge has been invoked as Indra in the garb of the bird.

Many personal traits of Indra are known to us. A large number of epithets has been applied to Indra (II. 21. 1–4; etc.), mostly expressive of his great might. His vastness is referred to in several places (III. 30. 5; III. 46. 3; etc.).

As regards Indra's weapons, the thunderbolt is almost exclusively restricted to him. Bṛhaspati has been mentioned, once as the holder of thunderbolt (I. 40. 8) or using it for killing the enemy (II. 30. 9). The bolt was fashioned by Tvastṛ (I. 121. 12; V. 34. 2); in some other places Uśanā has had the same work attributed to him. (I. 121. 12; V. 34. 2). Many characteristics of the bolt are mentioned: It is metallic (āyasa), golden (I. 57. 2; etc.), bright (III. 44. 5) or tawny (III. 44. 4; etc.). It is four-angled (IV. 22. 2), or hundred-angled (IV. 17. 10), hundred-jointed (VII. 6. 6) and thousand-pointed (I. 80. 12). Indra has also been mentioned as armed with a bow and arrows (VIII. 45. 4; X. 103. 2, 3; etc.) and as carrying a hook (VIII. 17. 10). In the Atharvaveda (VIII. 8. 5–8), Indra is said to have a net.

Indra's golden car (VI. 29. 2) is drawn by tawny steeds (I. 174. 6; I. 177. 1; IV. 32. 22–24; etc.). The steeds vary in number from two to one hundred (II. 18. 4–6) and a thousand (II. 13. 9). They are white-backed (VIII. 1. 25) and sun-eyed (I. 16. 1, 2). The steeds are the givers of rain (I. 177. 2; VI. 44. 20). The steeds, as they travel, split up the directions into two (III. 43. 6). Indra's chariot and steeds were fashioned by the Ṛbhus (I. 111. 1; V. 31. 4).

Indra is said to be related to several deities. His mother is Aditi (IV. 18. 8), also the cow (gṛṣṭi) (IV. 18. 10; X. 101. 2). He is also called the son of one with a band round the neck (*niṣtigrī*) (X. 101. 12). Indra's father seems to be Tvaṣṭṛ (I. 32. 2; II. 17. 6; etc.), Agni is his twin-brother (VI. 59. 2). He is the seventh brother of the Ādityas (X. 99. 2). Pūṣan is also his brother (VI. 55. 5). Indra's wife is mentioned in several places (I. 82. 5-6; V. 37. 3; X. 86. 11, 12; etc.).

Indra is helped by the Maruts in his works (I. 52. 4; I. 100. 1–15). In fact, he is called the master of the Maruts (III. 40. 3). He was also helped in his works by the Ṛbhus, with whom he rides in the same chariot (III. 60. 4). The

Aśvins also helped Indra in his works (I. 116. 21 ; X. 131. 4) ; once, they saved Indra (X. 131. 5).

We are told something about the birth and origin of Indra. Two hymns (III. 48 ; IV. 18) are concerned in describing his birth. He is often described as having been born. He is said to have wished to be born in an unnatural way through the side of his mother (IV. 18. 1, 2). He illuminates the sky after being born (III. 44. 4). He sets the wheel of the sun in motion after his birth (I. 130. 9). He was a warrior from his very birth (III. 51. 8 ; V. 30. 5 ; VIII. 45. 4 ; etc.). The mountains (sky ?), heaven, and earth trembled with fear when he was born (I. 61. 14). Indra, again, is said to have sprung from the mouth of *Puruṣa* (the Divine Being) (X. 90. 13). He is said to have arisen from Prajāpati (Śatapatha Brāhmaṇa and Taittirīya Brāhmaṇa).

Indra's abode is high up (II. 30. 5) in the heaven (II. 31. 3). Indra and Varuṇa travel over the dusty region (*rajas*—sky ?). He is lord of heaven (III. 30. 21). Indra, immediately after birth, is placed in the highest region (*parama vyoma*) (III. 32. 10). Again he has been invoked, with the Maruts, to come from heaven, sky, earth, water, the place of the sun (*ādityaloka*) and the distant place.

I shall now deal with the characteristic deeds of Indra. (1) Indra is connected in various ways with the heaven, sky, and earth. He is said to support them (III. 32. 8 ; III. 49. 4 ; IV. 16. 3 ; etc.), to have placed the luminaries in the heaven (I. 81. 5), to have built the universe (II. 12. 4), and to protect the flowers and annuals in the fields (II. 13. 7). Most of these works, however, cannot be properly said to be characteristic of Indra, as many other deities have also been endowed with these functions. (2) The main characteristic work of Indra is exhibited in connection with darkness, cloud, thunder, and rain. Indra is said to have covered (every thing) with widespread darkness (II. 17. 4). On the other hand, he is said to have removed darkness (VI. 17. 5), to have come out of darkness, and to have become bright (III. 39. 5). He is said to have relieved many dawns, autumns, and years of darkness (IV. 19. 8). Evidently, all these passages refer to widespread cloud-formation causing darkness. We have also direct mention of clouds. Thus, immediately after the birth of Indra, large clouds were held together and these poured down water on the ground (IV. 17. 2). Indra travels over the clouds (I. 155. 1), which he makes to grow (V. 32. 2). He cleaves the clouds (III. 30. 21 ; III. 45. 2 ; etc.), held fast by Vṛtra (II. 17. 1). He made water flow from the clouds (I. 33. 10 ; III. 57. 2 ; X. 99. 3 ; etc.). He released the choked clouds in the rainy season (V. 32. 2). In numerous passages, Indra has been regarded as the rain-pourer (I. 10. 10 ; II. 11. 9 ; IV. 30. 18 ; etc.). He gives rise to incessant rain with the help of Bṛhaspati

(II. 23. 18) and Pūṣan (VI. 57. 4). He has been invoked many times to give rain (I. 74. 9; etc.). He is said to fill up the rivers with water and to form rivers (IV. 19. 7; VI. 44. 21; etc.). He filled up the seas with water (I. 174. 9) and made it rise up (II. 15. 6). There are many evidences of his connection with thunder and storm. Thus, the heaven and earth, seas and mountains tremble with fear when Indra is born (I. 16. 14). He destroyed the villages by his thunderbolt, cleft the seven palaces of Autumn (I. 174. 2; VI. 20. 10) and broke the mountain peaks (V. 19. 5). All these phenomena are distinctly referred to in the killing of various demons (Dāsas) by Indra (see below). (3) Indra is again intimately connected with the sun. He has been identified with the sun (II. 30. 1; IV. 16. 1; VIII. 82. 4; X. 89. 2). His car has been called sun-eyed. Again, the sun is said to have originated from Indra (III. 30. 12); Indra fashioned the sun (II. 7. 12; III. 31. 15; III. 32. 8). He produced the brightness of the sun (II. 13. 7) and fashioned his path (X. 111. 3). Indra, with Soma (VI. 72. 2), raised the sun high up (in the sky). Indra holds the sun (I. 52. 6). He has placed him (in the sky) (VI. 17. 5) and makes him ascend in the sky (I. 7. 3; I. 51. 4). He makes the sun visible to us every day (VI. 30. 2). He is invoked (IV. 41. 6) so that one may see the sun for a long time. Indra is said to have produced the day (III. 34. 4) and make it visible (VI. 47. 21).

Indra has also arranged for the path of the moon in the sky (X. 138. 6).

Indra is also connected with dawn. He is said to have produced dawn (III. 31. 5; III. 32. 8) and established dawn (VI. 17. 5). Again, he is said to have destroyed her (IV. 30. 8–10), to have broken her chariot into pieces (II. 15. 6) and got her kidnapped by the sun (II. 20. 5).

Lastly, let us study some of the past deeds of Indra. (1) Of all the past deeds of Indra, the story of conflict between the sun and Etaśa and Indra's intervention in this matter is of great value to us. The true significance of this myth has already been dealt with in another place (*Indian Historical Quarterly*, Vol. V, 1929, p. 136). The story is told in a fragmentary form in a few passages (I. 61. 15; II. 19. 5; IV. 30. 6; V. 29. 5, 10; V. 31. 11; VIII. 1, 11). In brief, it runs thus: There was a conflict between the sun and Etaśa. Indra intervened in the conflict. In some passages Indra is said to have obstructed the sun and have allowed Etaśa to go ahead; in others, Indra got hold of Etaśa and made the sun advance. (2) The story of Dadhīci is depicted in six passages (I. 84. 13, 14; I. 116. 12; I. 117. 22; I. 119. 9; X. 48. 2). Adhering to what is found actually in the Rigveda, we may narrate the story as follows: Dadhīci had the head of a horse, which the Aśvins bestowed upon him. Dadhīci received the honey from

Tvaṣṭṛ and gave it to Aśvins. The honey became a sort of binder round their (Aśvins') waist (*apikakṣya*). Indra, in search of Dadhīci's horse-head hidden in the mountains (clouds), got it in the region of darkness (*śaryanāvati*). He drove the cows (light ?) towards Dadhīci and killed the Vṛtras ninety-nine times with Dadhīci's bone (that is, thunderbolt made from Dadhīci's bone). (3) Indra killed the son of Tvaṣṭṛ (*viśvarūpa*) (III. 48. 4) (see above). (4) Indra brought out Agrū's son, surrounded by white ants, from the anthill. Agrū's son, thus taken out, although blind came to see Ahi. All the separated joints came together.

Although Indra has been mentioned many times in most of the Brāhmaṇas, there is nothing to be found there for our purpose. In Taitti. Br. (1, 5. 1, 5) the asterism *Śatabhiṣak* is assigned to Indra ; but in ancient astronomical works the asterism is meant for Varuṇa. In Śatapatha Brāhmaṇa (5. 3. 3. 6), Indra is called Jyeṣṭha (the eldest). In Pitāmaha-siddhānta Indra is also called Jyeṣṭhā and in the Vedāṅga-jyotiṣa (Yaj. 33 ; Arc. 26) he is the presiding deity of the asterism Jyeṣṭhā. Indrāgni together is the presiding lord of Viśākhā (Yaj. 33 ; Arc. 26).

I shall now discuss on the physical nature of Indra. He is taken as the 'thunder-god, gigantic in size, a mighty eater and drinker, who slays the dragon with his lightning bolt' (see Macdonell's *Vedic Mythology*, p. 66). There is not the least doubt that Indra is a thunder-god and giver of rain. But we can proceed further. He is intimately connected with the sun, the sun's path and dawn. These facts lead us to the conclusion that he is connected with the ecliptic. Again, the passages in which he is stated to have produced the brightness of the sun, to have made the sun ascend in the sky, to have produced dawn and again to have destroyed her through the sun, all make us believe that he is connected with that part of the ecliptic which corresponds to the summer solstice. In northern India, the summer solstice is connected with rain and thunderstorm (summer monsoon) ; in the summer solstice the days are longest with a prolonged dawn, curtailing the night, and an early rise of the sun. All the facts concerning Indra and his connection with the sun and dawn can be well-explained if we accept him as 'the god of the summer solstice'. We have a further confirmation of this in the allegorical story of the conflict between the Sun and Etaśa. We take Etaśa as the *mean sun*. Their conflict means the point where they meet, that is, where the equation of time becomes zero. There are two components of the equation of time, one of which is the obliquity of the ecliptic and the other is the eccentricity of the orbit of the earth. The equation of time, due to the first cause, makes the true sun and mean sun (Etaśa) meet in the two equinoctial and solstitial points. But the combined effect is to place the meeting point on one side of these four points. When this meeting point was placed before the summer solstice, the true sun was slower than the mean sun at the time of that solstice. When this meeting point was behind the summer solstice, the true sun was faster than the mean sun at that time. This meeting point is not fixed, but is moving very slowly year after year. The idea that Indra is the god of summer solstice has already been set forth by Plunket in his *Ancient Calendars and Constellations*, p. 115.

I shall now attempt to interpret some of the facts concerning Indra. Indra's connection with Varuṇa may be easily explained if we remember that the rains continue till the autumnal equinox (which is presided over by Varuṇa). Indra's origin from the mouth of *Puruṣa* (=*saṃvatsara*, Gopatha Brāhmaṇa, pūrva 5. 3, 5 and Śatapatha Brāhmaṇa, 12. 2. 4. 1) simply indicates that the beginning of the year was counted from the summer solstice. The story of Dadhīci, again, seems to be allegorical. Dadhīci is the horse-head constellation figure in the asterism Aśvinī. The Aśvins are the two stars of the same asterism, with their triangular chariot, the *bharaṇi nakṣatra* (*Indian Historical Quarterly*, Vol. VI, 1930, p. 172). Tvaṣṭṛ is the presiding deity of the asterism *Citrā* (Vedāṅgajyotiṣa). Honey which formed the girdle round the waist of the Aśvins may be that part of the milky way extending from Citrā to Aśvinī. When the summer solstice was near the asterism Citrā, this asterism used to appear in eastern horizon at or before dawn and the Aśvinī with the horse-head constellation-figure lay on the western horizon, the latter covered with clouds and darkness. The clouds used to be dispersed with rain and thunder and at the same time the daylight used to make its appearance.

4. *Viṣṇu.*

Viṣṇu has been invoked thrice alone and twice with Indra; in one hymn (I. 22) he has been praised alone in several passages and with Indra in others. Altogether he is eulogised or otherwise mentioned for about one hundred times.

Viṣṇu is friendly with the Aśvins (I. 156. 5) and with Indra (I. 22. 19). He remains associated with Indra (I. 156. 5). He and Indra are regarded as the masters of Soma (VI. 69. 3). The Maruts protect the sacrifice for Viṣṇu (I. 85. 7).

Viṣṇu is brilliant, seven-rayed (I. 155. 1), hundred-rayed (VII. 100. 3). He travels above the clouds with Indra (I. 155. 1).

The essential feature of Viṣṇu is his three strides (I. 154. 2, 3; I. 22. 17, 18), which are meant for Indra (VIII. 52. 3) and by which he travels round the worlds (I. 155. 4; VI. 49. 13). He goes to his very distant abode by these three steps (I. 154. 3). His highest step (I. 22. 20, 21) has a well, full of honey (I. 154. 5). Two of his steps are visible to men, but the third one is beyond the flight of birds or beyond the idea of mortals (I. 155. 5; VII. 99. 2). Viṣṇu is further called wide-going (*urugāya*) and wide-striding (*urukrama*).

Viṣṇu is said to support the earth by his rays (VII. 99. 3). He supports the east side of the earth (VII. 99. 3). Like several other deities, Viṣṇu is regarded as supporting the worlds (I. 154. 4; VII. 99. 2).

The principal deeds of Viṣṇu are closely similar to (or identical with) those of Indra. Associated with Indra, he killed Vṛtra (VI. 20. 2) and destroyed the tricks of Vṛṣaśipra (VII. 99. 4). He also killed Varci and destroyed the strongholds of Sambara (VII. 99. 5). Again, Viṣṇu made the circle of 90 × 4 revolve like a wheel (I. 155. 6).

Viṣṇu is of much less importance in the Vedas, but he comes into great prominence in the Brāhmaṇas and in the Purāṇas. I shall here confine my attention to the Rigveda only.

It is unanimously held that Viṣṇu represents the sun. His essential characteristic, namely, his three steps, has been differently interpreted. The three steps have been regarded as his going to the heaven, sky, and earth by Śakapūnī (Nirukta 12, 19). The commentator, Durgācārya, considers the three steps as the rise, ascent to the midsky and setting of the sun. We take the three steps as the shifting of the sun from the equinoxes to the solstice and from the solstice to solstice. Beginning from the equinoctial point in the mid-heaven, the first step is the sun's northward passage to summer solstice, the second step is his passage from the summer solstice to the winter solstice at the opposite side, and the third step is his passage from the winter solstice back to the equinoctial point. The positions of the two solstices are clear and distinct at the two ends, but the common place of the two equinoctial points is not visible; this has already been referred to (see above). Further, Viṣṇu's setting the circle of 360 in motion (see above) evidently refers to the annual motion of the sun and not his daily passage through the sky. Lastly, his association with Indra and his works common to those of the latter as the god of summer solstice, is quite clear.

IV. Seasons.

1. *Ṛbhus.*

The *Ṛbhus* have been invoked in some seven hymns and celebrated or simply mentioned by name in a large number of scattered verses.

They have been addressed as the sons of *Sudhanvan* (good archer) (I. 110. 2; III. 60. 1; IV. 35. 1; etc.), sons of *Indra* (III. 37. 4) and grandsons of *Śavasa* (might) (III. 35. 1; III. 37. 4). They have also been referred to as children of *Manu* (III. 60. 3) and as *Ādityas* (VIII. 9. 12).

The *Ṛbhus* are bright (I. 161. 11; IV. 36. 5) like the sun (I. 110. 4); they are deft-handed (X. 66. 10), skilful (IV. 33. 1, 8), all-spreading (IV. 34. 9), leaders (of the world) (IV. 34. 9), and holders of the heaven (X. 66. 10).

Regarding their ornaments and equipments, we hear of their metal helmets and fair necklaces (IV. 37. 4) and of their bright car and fat steeds (I. 161. 7; IV. 37. 4; VII. 48. 1).

The *Ṛbhus* are three in number: *Ṛbhu*, *Vibhu* (or *Vibhvā*), and *Vāja* (I. 161. 6; IV. 33. 3). Fire has been invoked as Ṛbhu on several occasions (II. 1. 10; etc.).

The *Ṛbhus* have been endowed with many powers. For convenience the works of the *Ṛbhus* may be grouped under two headings: their usual work and past deeds. Their usual work is to make the charioteer skilful (IX. 22. 6), to lower the felly of the wheel of the chariot (VIII. 75. 5), and spread the firmament in a moment (IV. 33. 1). They also produce grass in the elevated regions and water in the low lands (I. 161. 11). They bring down Indra's thunderbolt from heaven.

We are informed of many wonderful past deeds of the Ṛbhus: (i) They rejuvenated the old and worn-out parents (I. 20. 8; I. 110. 8; IV. 33. 2, 4; etc.). (ii) They fashioned a car for the Aśvins (I. 20. 3; IV. 33. 8; X. 105. 6; etc.). This three-wheeled car traverses the sky without horse and reins (IV. 36. 1); it moves in a circle without turning (IV. 36. 2); and when this car rises in the heaven, the maiden of the sky (*Kanyā*) makes her appearance (X. 39. 12). (iii) They made a cow (I. 161. 3; IV. 34. 9), which is omniform (*viśvarūpā*) (I. 161.6) and yields nectar (I. 20. 3; III. 60. 2; etc.). The cow was formed out of hide (I. 110. 8) or drawn out from the hide (I. 161. 7; etc.). They again created the mother (cow) from the young (calf). They fashioned the cow for *Bṛhaspati* who drove up the omniform (*viśvarūpa*), while *Indra* yoked the two steeds and the Aśvins yoked the car (I. 161. 6). They also protected the cow up to (the end of) the (whole) year and formed her limbs out of the flesh throughout the whole year and protected her beauty up to the end of the year (IV. 33. 4). (iv) They divided the cup devised by *Tvaṣṭṛ* (I. 20. 5) who is also mentioned as an *Asura* (I. 111. 3, 5; I. 161. 8; III. 60. 2; IV. 35. 2, 3; etc.). The eldest said that he should divide the cup into two, the second said that he should divide it into three, and the youngest that he should divide it into four (IV. 33. 5). When Tvaṣṭṛ said that those who have defied the drinking cup of the gods should be killed, the Ṛbhus took another name from that time and the maiden (*Kanyā*) pleases them by calling them by that name (I. 161. 5). When Ṛbhus had broken the cup into four pieces, Tvaṣṭṛ concealed himself amongst the women (I. 161. 4). In other places we are told that Tvaṣṭṛ expressed his desire (that the cup should be so broken) (IV. 33. 6) and praised them (IV. 33. 5). The Ṛbhus again made the cup (I. 161. 9). The cup is brilliant like the day (IV. 33. 6). (v) They made a steed out of another (I. 161. 7), prepared a shoulder-guard, separated the earth from the heaven, and produced a beautiful son (IV. 34. 9).

Owing to their wonderful deeds they gained immortality although they were mortal beings (I. 110. 4; III. 603; IV. 36. 4). They also obtained the friendship of various gods—*Ṛbhu* of *Indra*, *Vibhu* of *Varuṇa*, and *Vāja* of the gods (IV. 33. 9).

We are told that one holds water to be the best, another fire, and the last one growth (vigour) (I. 161. 9).

There is a passage (I. 164. 44) which runs thus: Three, provided with hair, look at the whole year in sequence of the *ṛtus* (seasons); of them, one strews (scatters), one sees the universe with his activity (work); of one there is motion, though no appearance (definite work) is seen. Sāyana takes them to be the fire, sun, and wind. They may equally well be taken as the three *Ṛbhus*, whose functions are to give rise to rain, to produce growth of vegetation and nothing in succession.

Lastly, there is a story concerning the *Ṛbhus*. They came to the house of the sun (named as *agohya* in some places) (I. 110. 2) and lay in his house. When they slept (in the house of the agohya), they asked the sun 'who awakens us here?' The sun answered 'the awakening dog; (it is a) complete year; reveal yourselves' (I. 161. 11). In another hymn (IV. 33. 7) we are told that when the *Ṛbhus* remain in the house of the sun for twelve days, they make the fields full of harvest and the rivers full of water.

I shall now discuss the physical basis of the *Ṛbhus*.

The word *Ṛbhu* means 'dexterous, skilful'; the word *Vibhu* 'the eminent' and the word *Vāja* 'the vigorous.'

Following Sāyana (in his commentary on I. 110. 6), some of the oriental scholars, as Wilson, etc., hold that the *Ṛbhus* are sun's rays. Max Müller states that the names are meant for the sun or Indra in many places. Weber takes them to mean the genii of creative time, past, present, and future. Others, as Ludwig, Zimmer, Kaegi, Hillebrandt, and Hardy rightly hold them as the genii of three seasons (See Macdonell's *Vedic Mythology*, p. 133). I shall discuss this view fully below.

That the *Ṛbhus* are the three seasons or rather their presiding deities can be well maintained from the following evidences: (i) Many acts attributed to the *Ṛbhus*, as, for instance, the production of grass on the elevated regions and collection of water in low lands, bringing down of Indra's thunderbolt, preparing harvest-field and filling of rivers with water, are really works of nature intimately connected with seasonal variations. (ii) The *Ṛbhus* are three in number. Let us see with what seasons they are connected. Although the Indian year is at the present day divided into six seasons, we have reason to believe that the division was very variable in the Vedic and Brahmanic times. We find the lowest number of two, summer and winter, in the Smṛtis (Śabda-kalpadruma, article '*ṛtu*'), but we have no evidence in the Rigveda. Such a division is quite feasible in the north-west portion of India (Panjab and Sind) where there are two extremely hot and cold seasons with or without scanty rains. Next comes the division into three: winter, summer, and rainy season (according to the Smṛtis). In Rigveda there are two passages (I. 164. 2, 48) in which a year has been said to consist of three *nābhis* (navels). There is mention of three seasons in Śatapatha Brāhmaṇa (III. 4. 4. 17; XI. 5. 4. 21) and Kauṣitakī Brāhmaṇa (XI. 7), where each of them is taken to consist of 120 days. Sāyana enumerates them as *grīṣma* (summer), *varsā* (rainy season), and *hemanta*. In smṛtis they are *śīta* (winter), *grīsma*, and *varṣā*. The *hemanta* has been said to be last in Śatapatha Brāhmaṇa (I. 5. 3. 13), or middle in Taittirīya Brāhmaṇa (III. 11. 10. 4). Such a division is confirmed when we consider the climatic condition of the Indo-gangetic plain that has a summer monsoon attended with more or less heavy rain and a more equable temperature all the year round. The *hemanta* evidently means the winter. Next we have mention of five seasons in Tāṇdya Brāhmaṇa (XII. 4. 8; XII. 2. 3), Śatapatha Brāhmaṇa (II. 2. 3. 14; II. 5. 2. 16; III. 1. 4. 20; III. 1. 4. 5), and Aitareya Brāhmaṇa (I. 1). In the last work it is distinctly mentioned that *hemanta* and *śiśira* (winter) have been taken to represent one. In Rigveda we have mention of five divisions of the cycle of the year (I. 164. 13) and five fellies of the wheel of the sun (I. 164. 14). The division into five is rather secondary to the division into six. The division into six seasons has been mentioned many times in the Brāhmaṇas and has also been indicated in the Rigveda

(I. 164. 13). Lastly, there is a counting of seven seasons in the Brāhmaṇas (Śatapatha, VI. 6. 1. 14; IX. 3. 1. 19; etc.; Taittirīya III. 8. 3. 3 *in a year of 13 months*). This is also seen in Rigveda (I. 164. 3, 15): there are three which are paired, and a single one (unpaired). This counting however takes into consideration an intercalary month. The names of all the seasons are found in the Rigveda. Of them, the term *gharma* (which meant heat in the Vedic times) occurs about 24 times and has been used to mean the heat of the fire and the sun (distinctly pointing to the summer heat in many places). The term *grīṣma* occurs once (X. 90. 6) only. The term *prāvriṣ* (rainy season) occurs twice (X. 103. 3, 7). The term *varṣā* does not occur in the Rigveda. The word *śarad* (autumn) occurs about 30 times throughout the work (in all the maṇḍalas) and has been used in the sense of a year, indicating a year-end. The term *hemanta* occurs once in X. 161. 4, where it points to an end of the year. The term *hima* (winter) occurs ten times in the first, second, fifth, sixth, and eighth maṇḍalas and in some passages (I. 64. 14; II. 33. 2; V. 54. 15); it indicates year-ending. There is no mention of the term *śiśira* which is used for the winter season in later periods (See Amarakoṣa). Lastly the term *vasanta* (spring) occurs twice (X. 90. 6; X. 161. 4) and in one passage it is made to indicate the year-ending. We find that the terms *gharma*, *śarad*, and *hima* occur many times in earlier hymns as shown by the name of their composers and by their grammatical peculiarities (see Arnold's *Historical Vedic Grammar*) and the others in the later ones. Hence we may take these three as the names of seasons into which a year used to be divided in the early Vedic period. Hence we may take the summer, autumn, and winter as the three recognised seasons of the early Vedic period. We are told that *Ṛbhu* obtained friendship with Indra, Vibhu with Varuṇa, and Vāja with the gods. From this we may infer that *Ṛbhu* is connected with the summer, *Vibhu* with the autumn, and Vāja with the winter. The same idea seems to be also suggested when we are informed that one of them likes fire, another water, and the third one growth or vigour. Considering the derivative meanings and the various deeds of the *Ṛbhus* I think that the summer includes the rainy season, the autumn includes the *hemanta* as well, and the *hima* (winter) includes the spring.

I shall now show to what extent the various functions assigned to the *Ṛbhus* can be reconciled or appropriately interpreted in the light of the above views. The derivative meanings of the names of the *Ṛbhus* are more or less obscure. The dexterity on the part of *Ṛbhu* may have some bearing on the works of heat in nature. The eminence of *Vibhu* in connection with rains may be related to the harvest supplying provision (hence the superiority over others). The vigour of *vāja* indicates the bodily vigour and strength which occurs in winter.

सन्दर्भ ग्रन्थ
REFRENCE BOOK

Sudhanvā, the father of the Ṛbhus, is probably the sign Sagittarius and probably the year-beginning and hence the beginning of the seasons used to be counted from the sign.

The usual works of the Ṛbhus more or less refer to the conditions of the sky and the surface of the earth at the time of the heavy rains with attendant thunderstorms.

The past deeds of the Ṛbhus can also be well interpreted. The parents are none but the heaven and the earth (dyāvā-pṛthivī) and their rejuvenation means the revival of the luxuriant growth of vegetation on the surface of the earth and the reappearance of the clear blue sky. The Aśvins' triangular car is the triangle formed by the principal stars of the zodiacal constellation *bharaṇī*. Its fashioning perhaps indicates its appearance above the horizon in the clear cloudless sky after the rains. The 'maiden of the sky' is more appropriately the sign Virgo than the 'morning', as interpreted by Sāyana. Being the fourth sign from Aries (*Meṣa*), both this and Virgo can be seen at the same time above the horizon. As the Aśvins are intimately connected with ūṣā in many hymns of the Rigveda, Sāyana was led to this conclusion. The appearance of the rains and thunderstorms is indicated by their fashioning of Indra's steed and the bringing down of his bolt. The cow seems to be the cloud and the nectar the rains. In some places the surface of the earth might have been intended by the cow (IV. 33. 4). Tvaṣṭṛ's cup, as already interpreted by the oriental scholars, is the moon's disk. This is distinctly indicated when we are told that the cup is brilliant like the day. The division of the cup into two, three, and four pieces may be taken to indicate that the seasons were made to commence with half-moon (first or last quarter) one-third-moon and one-fourth-moon (last two corresponding to crescents, that is, its different phases); and their refashioning of the cup means the formation of the full-moon. The origin of one steed from another and the birth of a beautiful (strong) child evidently refer to the breeding and gestation occurring in some particular season. The separation of the earth from the sky probably indicates the clearing of the sky and hence its clear distinction from the earth after the rains. The making of a shoulder-guard is perhaps the production of bodily vigour (strong arms and shoulders) under the influence of a bracing climate.

The story of the Ṛbhus sleeping in the abode of the sun and their awakening by the dog as the year was at an end leads us to the following astronomical interpretation: (i) The abode of the sun is a part of his apparent circular path through the heaven, that is, the ecliptic. (ii) The sleeping of the Ṛbhus for 12 days in the abode of the sun means that the progress of the season becomes very much slowed or comes nearly to a standstill. This also indicates the slowing of the sun's journey through the heaven or, what is the same thing, the slowing

यह पुस्तक वितरित न की जाय
NOT TO BE ISSUED

down of the speed of the revolution of the earth round the sun. This slowing takes place to the greatest extent in a certain point of the earth's elliptical orbit round the sun known as the aphelion. Seen from the earth the sun is seen to occupy just the opposite point, the perihelion, where the motion of the sun is seen to be greatly slowed down. The slowing of the progress of the season has nothing to do with the winter solstice as held by the oriental scholars. This misapprehension arose from the fact that the perihelion is at present at a distance of few degrees from the winter solstice. (iii) The dog awakening the Ṛbhus is the brilliant star, Sirius, so well-known to the ancients. (iv) The season was *śarad* at that time, which represented the end of the year. We may now infer that the period in which the actual observation was made was characterized by the coincidence or closeness of the sun's position in the perihelion with the autumn and the heliacal setting of the Sirius. There is reason to believe that the beginning of a year in ancient times was generally counted from an equinox or a solstice; hence we may suppose that the perihelionic position of the sun and the autumnal equinox were more or less coincident at that time. Both the perihelion and the equinoctial points are movable; they revolve in opposite directions. We can find out the approximate time of their coincidence from the following calculation:

The distance of the perihelion from the vernal equinox in Jan. 0, 1900, according to Newcomb is

$281^\circ\ 13'\ 15'' + 61\ 89''\cdot 03\ T + 1''\cdot 63T^2 + 0''.\ 012T^3$
where T=a century.

The position from the autumnal equinox is then

$281^\circ 13' 15'' + 6189''\cdot 03T + 1''\cdot 63T^2 + 0''\cdot 012T^3 - 180^\circ$
$= 101^\circ\ 13'\ 15'' + 6189''\cdot 03T + \text{etc.}$

Taking the motion of the perihelion 16″· 89 for a year and calculating backwards the number of years for the arc of 101° 13′ 15″, we find that the perihelion and autumnal equinox coincided some 5887 years ago, that is, in 3987 B.C.

The position of the vernal equinox at the above epoch, taking the approximate annual motion of the equinoxes to be 50″· 25, was

$$5887 \times 50''\cdot 25, \text{ or } 82^\circ\ 101'\ 2''$$

behind the present position. As the present position of the vernal equinox is placed in the sign Piscis at a distance of 18° 44′ from the beginning of the sign Aries, its position at the above period was

82° 10′ 21″—18° 44′ or 63° 26′ 21″ behind the beginning of the sign Aries. This corresponds to the beginning of the sign Gemini. The star Sirius, placed at about 82° from the beginning of the sign Aries, used to appear in the sky in the evening at about the end of the year. The autumnal equinox was placed in the beginning of the sign Sagittarius and used to indicate the end and beginning of the year.

2. *Ṛtu.*

One complete hymn (I. 15) is dedicated to *ṛtu*, where most of the eminent deities have been asked to drink Soma with her (Ṛtu) in addition. Mentioned in more than thirty passages she is Soma's mother (II. 13. 1). The sun is a division of ṛtu (II. 38. 4). Agni (V. 12. 3; X. 2. 1.), Indra (III. 47. 3; X. 99. 10), Ṛbhus (IV. 34. 7), and the sun (III. 20. 4) are called the originators or masters of ṛtu (*ṛtupā*). The sun and moon have arranged for her (X. 85. 18). Day after day and ṛtu after ṛtu are passing (X. 18. 5). In one passage (VII. 103. 9) it is said that the frogs do not envy the twelve ritus; when the rainy season comes after the year is over, the frogs, having suffered from the summer heat, come out of their holes (VII. 103. 9).

There are other passages where ṛtu is used for 'time'. This use is confined to the hymns of the tenth maṇḍala. But, considering the above passages, one is justified in thinking that the word was originally used to mean 'month'. Only in later times the sense was changed for time in general. It does not seem to have been used for 'season' in any place.

We have *numerous* references to ritus as seasons (five or six number) in the Brāhmanical literature.

V. PLANETS.

1. *Planets in general.*

There are several passages in the Rigveda which seem to refer to planets.

In VIII. 14. 9, the stars (*tārakā*) are said to have been fixed and made immovable by Indra. On the contrary, there is mention of moving luminous bodies in the firmament (heaven). In I. 37. 9, we are told that the firmament is fixed ; the *birds* can fly through it. Again, Varuṇa is said to know the track of birds flying in the firmament and of the boats flying in the ocean (vast sky) (I. 25. 7). Puṣan's golden boats ply in the heaven (VI. 58. 3). In all these passages, the birds and boats may be taken for planets. There are two other terms, *ukṣā* and *adhvaryu*, which may refer to planets again. Ukṣā means one which sprinkles or emits (spark or light). Adhvaryu means one who lights the sacrificial fire—secondarily, one who lights fire in the heaven, which glitters in the heaven. In III. 7. 7, we are informed that the seven Brāhmanas are guarding their favourite place with five Adhvaryus ; and that the immortal Ukṣās of the sky are regularly moving towards the east. Again, in I. 105. 10, we are told that the five Ukṣās which move in the sky have their motion stopped now. In the first of these two last passages, I take the seven Brāhmanas as the constellation Great Bear (*Saptarṣi*). The five Adhvaryus may be the five planets (see Hillebrandt: *Vedische Mythologic*, pp. 3, 423). In the second passage, we have reference to the stationary position or retrograde motion of the planets. Lastly, the earth has been qualified as Ukṣā (IV. 56. 1, 2). Hence she might have been taken as one of the planets.

The two deities Bṛhaspati and Vena, considered below, perhaps represent Jupiter and Venus.

2. *Bṛhaspati.*

Bṛhaspati is invoked in some eleven hymns and in part of another hymn. In two hymns he is praised with Indra. Altogether, he is mentioned or eulogised some hundred and seventy times or more. He seems to be closely connected with Agni (I. 38. 13 ; III. 26. 2 ; etc.).

Bṛhaspati is the same deity as Brahmanaspati, as he is addressed in II. 23, by both the names.

Bṛhaspati is seven-mouthed (IV. 50. 4), seven-headed (X. 67. 1), and seven-rayed (IV. 50. 4). He is hundred-winged (VII. 97. 7). All these epithets seem to refer to his brilliancy.

He is distinctly called bright (I. 190. 1; III. 62. 7), bright like a meteor (X. 68. 4) and ruddy and golden-coloured (V. 43. 12). His close relationship with Fire may have something to do with these characters. He has a beautiful tongue (I. 190. 1; IV. 50. 1). He is clear-voiced (VII. 97. 5). He is great (I. 190. 8) and mighty (I. 190. 3, 8). He is blue-backed (V. 43. 12).

Of the implements, Bṛhaspati has a bolt (I. 40. 8; II. 30. 9), a bow with arrows (II. 24. 8), and a golden axe which Tvaṣṭṛ sharpens (X. 53. 9). His car is bright, cleaves the clouds (*gotrabhid*), and knows the heaven (II. 23. 3). His steeds are ruddy (VII. 97. 6).

Bṛhaspati's abode is beautiful (VII. 97. 7) and is situated in a luminous region (VI. 73. 1) at a very high distant place (V. 50. 3). Again he is said to have three abodes (IV. 50. 1).

Bṛhaspati is the father of the gods (luminaries) (II. 27. 3; IV. 50. 6). He is the eldest (jyeṣṭha). Rodasī (Heaven-earth) is his mother (VII. 97. 8). He was given birth to by Tvaṣṭṛ (II. 23. 17). He was born first (VI. 73. 1) and was born by divine law (X. 67. 1). Again, he is said to have been born first in the high space of the luminous region (IV. 50. 4).

The deeds of Bṛhaspati are closely similar to those of Indra. He destroys darkness (II. 23. 3; X. 68. 5), cleaves the clouds (II. 24. 4; VI. 73. 1), causes rainfall (I. 190. 1, 8; VI. 73. 1; etc.), and loosens the fixed ones and uproots them (II. 24. 3). He rent Vala (IV. 50. 5; II. 24. 3), and killed the Sambaras (II. 24. 2), Vṛtras (VI. 73. 2) and helped Indra in killing the followers of Kriṣna (VIII. 96. 15). He opened up the rocky door with the help of the noisy geese (probably the Maruts) (X. 67. 3). He opened the door for the downpour of rain in the autumnal months (II. 24. 5). He released the cows (light) from inside the mountains (darkness) (II. 23. 18; IV. 50. 5; X. 67. 4; X. 68. 2; etc.). When the multiform water (*viśva-rūpaṃ vājam*) became agitated, Bṛhaspati ascended to the upper part of the heaven; the various luminaries praised him (X. 67. 10). Like many other deities, Bṛhaspati is regarded as having made the ends of the earth steady (IV. 40. 1). He is also called the lord of a flock (gods ?) (II. 23. 1). Several minor deeds are also assigned to him (I. 18. 2; etc.).

Bṛhaspati is regarded as the presiding deity of the asterism Tiṣya (Puṣyā) (Taitt. Sam. 4. 4, 10. 1; Taitt. Br. I. 5. 1, 2; 3. 1. 1, 5; Vedāṅga-jyotiṣa).

Macdonell (*Vedic Mythology*, pp. 103-4) has discussed the views of all the oriental scholars. Macdonell remarks that he was a representative of Agni at first, later became the deity of Tiṣya and in post-Vedic times as the planet Jupiter.

I can find no reason why we should not regard him as the planet Jupiter even in the Vedic times. The characteristics of Bṛhaspati lead us to this conclusion. He stands next to

Venus in brilliancy. His characteristic deeds evidently refer to his rising in the sky during the summer monsoon.

3. *Veṇa.*

This deity is invoked in a single hymn (X. 123. 1), although the name occurs several other times in the Rigveda. In the singular, it has been used to qualify the sun (I. 83. 5), Indra (I. 61. 14), and Bṛhaspati (I. 139. 10), signifying brilliancy or beauty. It has also been used in the same sense in the plural in several other passages (I. 56. 2; IX. 64. 11; IX. 73. 2; etc.).

Veṇa is a messenger of Varuṇa (X. 123. 6). He has a bright appearance and his back (or surface) is seen (I. 123. 2). He is also called bright-wombed (X. 123. 1). He has bright wings (X. 123. 6, 7). He holds a spotted weapon and has a shining armour (X. 127. 7).

Veṇa remains brilliant on the top of the sky (X. 123. 2) where he travels (X. 123. 3). He is reddish in colour (IX. 21. 5). He is said to be one remaining in the womb of the spotted (heaven) (X. 123. 1). He arises in the sky and wanders in a high place (X. 123. 7). He is a swift mover (X. 123. 8). He is called a celestial musician (X. 123. 4, 5), and is said to roar like a buffalo (X. 123. 4). Veṇa is also connected with lightening (apsarā) as his lover (X. 123. 5). He is again called a pourer (of rain ?) (X. 123. 8).

Veṇa is connected with the moon in two passages. The moon is said to order Veṇa (IX. 21. 5). Veṇa remains in the heaven of the moon above the sky (VIII. 63. 1).

There is a passage (IV. 58. 4) in which we are told that Indra brought out the luminous bodies that were concealed in three places in the clouds (goṣu). Again, we are told (X. 123. 8) that, when Veṇa makes his appearance by his brightness in the firmament, the sun illuminates the third world (third part of the sky) with his white light.

Taking into account his brightness, place in the heaven, and connection with the moon, I regard Veṇa as the planet Venus. The close similarity in name and identical significance in their derivation (see *Century Dictionary*, word 'Venus') are confirmatory evidences of this view.

VI. STARS, ASTERISMS, AND CONSTELLATIONS.

A. *Deities connected with Stars.*

1. *Aja Ekapāt.* The name of the deity occurs six times (II. 31. 5; VI. 50. 15; VII. 35. 13; X. 64. 4; X. 66. 11). He has been invoked five times with Ahirbudhna, thrice with the sea, twice with the earth, and once with several other deities, as the sun, fire, *Pṛśni*, *Bṛhaspati*, river, sky, roaring cloud, *Sindhu*, *Ṛhbus*, *Āpa*, and *Sarasvati*. In one passage (X. 65. 13) he has been called a roarer and one provided with the thunderbolt (*pāvīrabī*).

The name also occurs in the White and Black Yajurvedas. In Vājasaneyī Saṃhitā (5. 35) Aja Ekapāt and Ahirbudhna have been designated as *gārhapatya* Fire, but in Taittirīyā Saṃhitā (1, 3. 3) Aja Ekapāt has been so called and Ahirbudhna as dakṣina (southern) Fire.

In Atharvaveda (XIX. 11. 3) we are told that *Rohita* (the sun) gave origin to the heaven and earth and that Aja Ekapāt was placed there.

The name of the deity also occurs in the Brāhmaṇas. In Taittirīya Brāhmaṇa (3. 1, 2, 8) the sun has been called Aja Ekapāt and in two other places of the same work (1, 5. 1, 5; 3. 1, 2, 9) we are told that Proṣṭhapada is placed on the east of Aja, Ekapāt and Ahirbudhna on the north of Proṣṭhapada. In Śatapatha Brāhmaṇa (8. 2, 4. 1) we are told that the goat climbed up after having become one-footed.

In Mahābhārata (I. 121) Aja Ekapāt, Ahirbudhna, and Mṛgavyādha have been counted amongst the eleven Rudras.

Yāska in his Nirukta (12, 30) says that Aja Ekapāt is one who walks with one leg or one who protects or drinks with one leg. The author of Nighaṇṭu (5, 6) regards him as a deity.

In Yājuṣa-jyotiṣa (Sl. 10) and Ārca-jyotiṣa (Sl. 9) we get the names in place of the asterisms Pūrva-proṣṭhapada and Uttara-bhādrapada. Again Aja Ekapāt has been regarded as the lord of Purva-bhādrapada (same as Pūrva-proṣṭhapada) and Ahirbudhna as that of Uttara-bhādrapada. In Pitāmaha-siddhānta (an old astronomical work) we find the names of Aja and Ahirbudhna after Dhaniṣṭhā in the list of asterisms with a north latitude (that is, placed north of the ecliptic). In Vṛddhavaśiṣtha-siddhānta (Ch. 8, Sl. 8) we are told that the two Ajapadas are placed on the north, evidently referring to Aja Ekapāt and Ahirbudhna. In another place (Ch. 8, Sl. 20) we find that Ahirbudhna does not disappear under the sun's rays (that is, it is placed higher up from the path of the sun). In Soma-siddhānta (4, 6, 32) and Sūrya-siddhānta (8, 16) we find the two Bhādrapadas mentioned in place of Aja Ekapāt and Ahirbudhna.

Roth and Boehtlingk (in their Wörterbuch) thinks Aja Ekapāt as the one-footed lord of the storm. Bloomfield, Victor Henry, and Wallis (in his Cosmology of the Rigveda, p. 54) take him as the sun. The view must have been derived from the Taittirīya Saṃhitā. Hardy calls him the moon. Bergaigne thinks him some isolated, hidden or unintelligible dweller on land. Macdonell regards him as the personification of lightening (*Vedic Mythology*, pp. 73, 74).

Considering what we find in the above-mentioned works, I am unable to accept any of the above views and from the evidences we have in the Brāhmanas and the astronomical works I am led to the view that the two deities in question represent two stars.

We see that, at the time when the Yājuṣa-jyotiṣa and Ārcajyotiṣa were composed (or compiled), Pūrva-bhādrapada and Uttara-bhādrapada were respectively known as Aja Ekapāt and Ahirbudhna.

In Taittirīya Saṃhitā (4, 10, 13) and Maitrāyanī Saṃhitā (2, 15, 20) two asterisms named Proṣṭhapadā are mentioned in their list; in Kāṭhaka Saṃhitā (39. 13) the two asterisms are named Proṣṭhapadā and Uttara-proṣṭhapadā. Again in Taittirīya Brāhmaṇa we find mention that Proṣṭhapada is placed on the east of Aja Ekapāt and Ahirbudhna on the north of Proṣṭhapada. The two Proṣṭhapadas, according to the later astronomical works, are the Pūrva- and Uttara-bhādrapadas. Each of the two asterisms consists of two principal stars, one of which forms the junction-star. The junction-star of the Pūrva-bhādrapada is α Pegasi; it is placed on the south; the other star is β Pegasi, placed on the north. The two stars of the Uttara-bhādrapada are α Andromedae (on the north) and γ Pegasi (on the south). The Pūrva-bhādrapada, again, is placed on the east of Uttara-bhādrapada. If the four stars of the two asterisms are joined together we get a four-sided figure. Following the view of Taittirīya Brahmaṇa, we consider Aja Ekapāt as α Pegasi. The Proṣṭhapada of the same work, viz. γ Pegasi, is placed on the east of α Pegasi. α Andromedae, placed on the north of α Pegasi, is Ahirbudhna.

I shall now try to explain the meaning of the name of Aja Ekapāt. We know that the sign Aquarius is partly formed by three-fourths of Pūrva-bhādrapada and the sign Pisces is formed by one-fourth of Pūrva-bhādrapada and the whole of Uttara-bhādrapada. The sign Capricornus (*Makara*) is placed before Aquarius. Although the Hindu figure of the sign Capricornus is represented by a fish-like animal with a long proboscis, the figure according to ancient Babylonian, Greek, and Arabian astronomy consisted of the front half of a goat with two front legs above and the hinderhalf of a fish below (as the name suggests).

It is highly probable that the two legs of the goat were made to extend in such a way that the stars α Pegasi and α Andromedae were placed, one on each leg. We can thereby understand why the two stars were called Ajapadas in the Vṛddhavaśiṣṭhasiddhānta. The change of the name to Proṣṭhapada (which means the leg of an ox or of cattle in general) makes us believe that the original figure of the goat was later changed to an ox or to cattle in general.

Lastly, we come to the interpretation of the attributes of Aja Ekapāt. His attributes as a roarer and the holder of the thunderbolt and his praise with the river, sea, and dusty earth lead to the idea that he was closely connected with storms and rains. In the ancient western astronomy we find that the sign Aquarius represents the sun as giver of rains and producer of storms. Thus we can easily understand why the deity is connected with storms and rains. We further know that in northern India the summer solstice is connected with storms and rains. In such a case we may think that the hymn was composed from observations taken at the time when the summer solstice was passing through the sign Aquarius which used to rise in the heaven at night with the stars α Pegasi and α Andromedae appearing at the eastern horizon. This happened sometime between 2000–2500 B.C.

In this connection we may mention that the phrases *devodhārtā sindhū* and *samudriya* Āpaḥ in X. 65. 13, seem to refer to celestial and not to earthly objects. The first phrase signifying 'Sindhu (river) supporting the heaven' probably means the long branching milky way. The other phrase meaning 'Āpaḥ belonging to the sea' indicates a star of the same name (see Āpaḥ).

2. *Apāṃ Napāt.* The deity has been invoked in one complete hymn (II. 35) and in one verse (V. 41. 10). The name also occurs in four other places (I. 143. 1; III. 5. 3; VIII. 44. 16; V. 8. 5) where the term has been used to qualify Fire. This use, as we shall see below, has some important significance regarding the physical nature of the deity Apāṃ Napāt.

We are informed of certain characteristics of the deity. He has been called a roarer (II. 35. 1). He is brilliant (II. 35. 3, 4, 7, 9, 11, 13), gold-like, and of a golden colour (II. 35. 10). His rays are beautiful (II. 35. 11). He is also called *āśuhemā*, that is, spreading (brilliant) like gold. He is placed above the firmament (II. 35. 9) and his abode is in the high region (II. 35. 14). He sits on the place made of gold (II. 35. 8). He feeds on nectar (II. 35. 5). It has been said that the Horse and Apām Napāt were born high up (in the heaven). Apām Napāt is found to be connected with water in various ways: He is full of water (II. 35. 8). He is the womb of the showerer (V. 41. 30). He, being filled with water, becomes pregnant in water and (again) tastes or drinks the same water as a child

(II. 35. 13). He is surrounded by water (II. 35. 3, 4, 7–9). The waters meet (with one another); others come to meet with them; and they equally satisfy the watery place formed into river (II. 35. 3). The waters, having a tendency to run together, make Apāṃ Napāt brilliant in the firmament (II. 35. 3). The waters are golden in colour and their course is crooked (II. 35. 9). Three goddesses hold the food of Apāṃ Napāt; they are as though made of water and they move in water (II. 35. 5). The cow of Apāṃ Napāt is a milk-giver and bestower of rain (II. 35. 7). The other worlds are the branches of Apāṃ Napāt (II. 35. 8). The herbs grow for him.

We do not find the name of Apāṃ Napāt in the Brāhmaṇas. In Nighantu (5. 4) he is regarded as the grandson of Apaḥ. He is considered as the god of the middle region.

In the ancient astronomical works of the Hindus (Vṛddha-vaśiṣṭha-siddhānta 8. 12; Brahma-siddhānta 2. 177; Soma-siddhānta 4. 6. 12; Sūrya-siddhānta 8. 21), we get mention of a stár, named *Apāṃ Vatsa* (θ Virginis); this is placed in the sign Virgo. The sign Virgo is characterised by numerous nebulæ, many of which can be seen with the naked eye. The modern constellation figure of the sign is that of a virgin holding a bunch of wheat in the left hand. 'In Egypt, Virgo was associated with Isis and it was reported that she formed the Milky Way by throwing millions of wheat-heads in the heaven.' Sometimes she is shown with wings (*Enc. Brit.*, 14th edit., the figure in the article 'constellation'). Again other women used to be also represented with the virgin in the same sign. α and γ Virginis used to represent two goddesses. The virgin was often represented with her daughter (see Whyte's *Constellations and their History*, 1928, pp. 123–7).

In Avesta, we find something about Apāṃ Napāt. He is the god of water and lives in the depth of water. He remains surrounded by women and is invoked with them. He rides on a fast-going horse and holds the light inside the ocean.

I shall now discuss the opinions of the oriental scholars. Spiegel, depending on the versions of the Avesta, thinks him to be some deity connected with Fire. Darmesteter takes him to be the Fire of the lightening produced in clouds. Schroeder is of the same opinion. Oldenberg thinks him to be a deity of water and says that it is by a mistake that he has been taken as Fire arising in water. Hillebrandt and Hardy identify him with the moon. Max Müller thinks him to be the sun or lightening. Macdonell considers him as the Fire in the form of the lightening of the cloud (see Macdonell's *Vedic Mythology*, p. 70). Lastly, Plunket (*Ancient Calendars and Constellations*, p. 129) considers him as 'the fire of water' that is, the fire of the sun passing over the sign Aquarius. He also thinks that at about 3000 B.C. the winter solstice was placed in the sign Aquarius.

We cannot accept any of the above views. Comparing the attributes of Apāṃ Napāt and the physical surroundings of Apāṃ Vatsa we consider them identical. All the attributes assigned to Apāṃ Napāt are easily explained if we take this view. The 'golden place' simply refers to the nebulæ in the surroundings. The 'waters' again refer to the same. The 'rivers' represent the Milky Way with its branches. The three goddesses were nothing but three brilliant stars in the surroundings (see above). The 'cow' is nothing but the cloud. The downpour of rain and the growing of herbs evidently refer to the period when the star used to rise on the heaven towards the end of the rainy season at night and hence the vernal equinox must have been placed near the Pleiades (Kṛttikā) at the time of the observation. This happened sometime between 1750–2000 B.C.

Lastly, since we find the deity mentioned in the Avesta, with more or less the same attributes, I believe that the star was recognised at a very early period of Aryan civilization.

3. *Ahirbudhna*. This deity has been praised in some twelve places, five times with Aja Ekapād and thrice with Apāṃ Napāt.

We do not get any idea of the deity from the Vedas. He has been said to be 'born from water' and to live amongst waters in the firmament (VII. 34. 16). He has been invoked not to cause any harm to the people (V. 41. 16; VII. 34. 17); thus he must have been considered as a malefic deity.

According to Yākṣa (4. 30), Ahirbudhna is one whose abode is in the firmament (antarīkṣa). According to Sāyaṇa, the term signifies 'one going to the firmament.'

Oriental scholars think this deity to be 'a serpent of the Deep'. Macdonell thinks that Vṛtra and Ahirbudhna were probably the one and the same god but that later they have become differentiated from each other.

We have shown under Aja Ekapād that Ahirbudhna is the star α Andromedae.

4. *Āpaḥ*. The present deity has been invoked seven times. She is brilliant (VII. 47. 3; VII. 49. 2-4) and producer (oozer) of honey (VII. 49. 3). She was born in the firmament (VII. 49. 2). We find the mention of her 'waves' (VII. 47. 2) which arose in the heaven (X. 30. 9). Indra drinks the (water from the) wave (X. 30. 9). She goes through water (VII. 49. 1) and has got medicine (from herbs) and fire in her body (X. 9. 6). Fire has entered the body of Āpa (VII. 49. 4). Varuṇa is her husband (VII. 49. 3). Indra released her once (VII. 49. 1). Varuṇa and Soma live in her abode (VII. 49. 4).

The name of Āpa occurs some forty-seven times in Vājasaneyisaṃhitā in connection with the *mantras* of various sacrifices. In many hymns she has been invoked for various kinds of benefit or gift. In the Atharvaveda, we find the word more than one hundred and twenty times. The goddess has been invoked several times. The word has also been used for water and for the milky way (heavenly waters) as well. No new characteristics of the deity are, however, available in either of these Vedas.

The term is also found in the Brahmanas. Āpaḥ has been called the life (prāṇa) (Taitt. Br. 3. 2, 5. 2 ; Tāṇḍya Br. 9. 9. 4 ; Śat. Br. 3, 8. 2, 4 ; Jaim. Br., Uttar. 3, 10. 9), the nectar (Śat. Br. 1. 9. 3. 7 ; 3. 9. 4. 16 ; 4. 4. 3. 15 ; Kaus. Br. 12. 1 ; Ait. Br. 8. 20), the well (Śat. Br. 6. 7. 4. 4 ; also in Yajurveda 12. 19), the pacification (Śat. Br. 1. 2. 2. 11 ; etc. Ait. Br. 7. 5. Tāṇḍa Br. 8. 7-8 ; Kaus. Br. 3. 6–9. Gop.-Br. 1. 25), the medicine (Kaus. Br. 3. 6–9 ; Gop.-Br. 1. 25), the sap of annual herbs (Śat. Br. 3. 6. 1. 7 ; 3. 3. 3. 18 ; 3. 9. 4. 7), reverence (Taitt. Br. 3. 2. 4. 1), vigorous (Śat. Br. 1. 1. 1. 1 ; 3. 1. 2. 10 ; 5. 3. 4. 13), pure (Śat. Br. 1. 1. 1. 1 ; etc.), milky juice (Tāṇḍa Br. 1. 3. 4. 8), the vaiśya (Kaus. Br. 12. 1), the food (*anna*) Śat. Br. 2. 1. 1. 3 ; etc. ; Taitt. Br. 3. 8. 2. 1 ; 3. 8. 17. 5 ; Kaus. Br. 12. 3. 8 ; Ait. Br. 6. 30 ; Jaīm. Br. Uttar. 1. 25. 9 ; 1. 29. 5), destroyer of evil (Taitt. Br. 3. 2. 3. 12 ; 3. 2. 4. 2), the bolt (Śat. Br. 5. 3. 4. 1), the sun (*arka*) (Śat. Br. 10. 6. 5. 2), the *Yajña* (Kaus. Br. 12. 1 ; Śat. Br. 1. 1. 1. 12, etc. ; Taitt. Br. 3. 2. 4. 1 ; Ait. Br. 2. 20) and the *retaḥ* (seminal fluid) (Ait. Br. 1. 3 ; Śat. Br. 3. 8. 4. 11 ; etc.). She has been called the wife of Varuṇa (Taitt. Br. 1. 1. 3. 8) and of Agni (Śat. Br. 6. 8. 2. 3). Again Āpaḥ is the favourite abode of the gods (*devas*) (Taitt. Br. 3. 2. 4. 2).

In Yājuṣajyotiṣa (Sl. 18, 33) and Ārcajyotiṣa (Sl. 14, 26), the Pūrvāsāḍhā nakṣatra is called ' Āpa ' and again she has been termed the lord of Āpaḥ. In Pitāmahasiddhānta, the word ' *āpa* ' has been used for the same asterism. In Somasiddhānta (4. 6. 4) the position of Āpa has been given with regard to *Abhijit*. In the same work (4. 6. 12) as well as in Brahmasiddhānta (2. 178) and Sūryasiddhānta (8. 21), Āpa is stated to be placed on the north of Apām Vatsa.

Āpaḥ has been mentioned in the Avesta as ' Āpo '.

Oriental scholars regard the present deity as the moon (see Macdonell's *Vedic Mythology*).

Following the astronomical works above referred to, we are inclined to take her to represent ∂ Sagittarius, the junction-star of Purvāsāḍhanakṣatra. The star is placed in the Milky Way.

Now let us see how far we can interpret her characteristics if we accept this view. Her brilliancy is well-explained by taking her to be a brilliant star. The honey she oozes out is nothing but the star-cloud of the Milky Way surrounding her. The waves again refer to the branches of the Milky Way. The idea that the moon lives in her abode is explained by the fact that she is a junction-star. Again the idea that Varuṇa is her husband and lives in her abode is well-reconciled if we assume that the autumnal equinox (which represents Varuṇa was close to the star at the period of observation. Further, the idea that Indra released her once is very nicely explained if we take Indra to represent the summer solstice. In such a case, the release by Indra simply means that the part of the ecliptic presided over by Indra had once passed through the star but was now replaced by another represented by Varuṇa. Her connection with medicinal herbs is understood since there was autumn at the time, the period of growing of the herbs. The numerous indefinite attributes of the deity recorded in the Brāhmanas are also explained if we adopt the present view.

5. *Tvaṣṭṛ*. This deity has been mentioned in some thirty-seven hymns.

Tvaṣṭṛ has been called *Viśvarūpa* (omniform or having the beauty of the world) (III. 55. 19). He has also been addressed by another name *Neṣṭṛ* (I. 15. 3), a name given to one of the main priests in a Soma-sacrifice.

Tvaṣṭṛ has a wife (X. 66. 3) and is the father-in-law of *Vāyu* (VIII. 26. 21, 22). Again he is the father of *Viśvarūpa*, the guardian of cows.

We hear of *Tvaṣṭṛ's* dexterous hands (III. 34. 20). He holds an iron axe in his hand (VIII. 29. 3) and has a chariot and steeds (VI. 47. 19).

Tvaṣṭṛ is a skilful workman (I. 85. 9 ; III. 54. 12) ; he fashioned (I. 32, 2 ; I 85. 9 ; V. 31. 4 ; VI. 17. 10 ; etc.) and sharpened (I. 52. 7) Indra's thunderbolt. He also sharpens the iron axe of *Brahmaṇaspati* who makes the cup by its aid (X. 53. 9).

We are informed of some of his deeds. Thus he makes the people long-lived by remaining in company with them (X. 18. 6). He develops the germ in the womb and shapes the human and animal forms (I. 188. 9 ; VIII. 91. 8 ; X. 184. 1). He has been invoked to bestow vigorous sperm (to male) for the generation of strong offsprings (III. 4. 9 ; III. 55. 19) and to give brave sons (VII. 34. 20). *Tvaṣṭṛ* fashioned a new cup (I. 205) which contained the food for the *Asuras* (I. 110. 3) or the beverages of the gods (I. 161. 5 ; III. 35. 5). He begot Bṛhaspati (II. 23. 17). *Tvaṣṭṛ*, along with the Heaven and Earth, the Waters and the Bhṛgus, generated *Agni*.

Tvaṣṭṛ remains in company with the gods' wives (II. 31. 4 ; II. 36. 3) ; when he found his cup divided into four pieces (by the Ṛbhus), he concealed himself among the women (1. 161. 4). He appears in many places of the world (VI. 47. 19).

Indra drank the Soma juice in Tvaṣṭṛ's cup by force (III. 48. 4) and by defeating him (IV. 18. 3). *Tvaṣṭṛ* trembles for fear of Indra's wrath. He was crushed by Indra who seized him by the foot (IV. 18. 12).

We are also told that the light (darkness-destroying energy) of *Tvaṣṭṛ* was caught (was concealed) in the moon's disk (11. 84. 15).

A story is told of the marriage of *Saraṇyu*, the daughter of *Tvaṣṭṛ* (X. 17. 1, 2). The whole world came to the occasion of the marriage of *Saraṇyu*. When she (the mother of Yama) was married to the sun, she disappeared. When the immortal (lady) was concealed from the mortals, a woman of her form (*Savarṇā*) was given to the sun and the Aśvins were born to them. *Saraṇyu* left the twins.

In later Sanskrit works *Tvaṣṭṛ* has been identified with the sun. In Kaúsika Sūtra he is identified with the sun and Prajāpati as well. In Mahabharat he has been recognised as a form of the sun. In Mārkaṇḍeya Purāna he has been identified with *Viśvakarman* and *Prajāpati*.

In Ārcajyotiṣa (sl. 9) and Yāyuṣajyotiṣa (sl. 10) he has been identified with Citrā (the star Spica) in one place and as its presiding deity in another (A.j. sl. 26; y.j. 33).

I shall now discuss the physical basis of the deity.

The name of the deity, derived from the root *tvaks* seems to mean "the fashioner" or "artificer" (see Macdonell's *Vedic Mythology*, p. 117).

Although *Tvaṣṭṛ* has itself been recognised as a deity in the Rigveda, still the name has been used in several places to qualify the fire and the sun.

Tvaṣṭṛ has been regarded as an obscure deity by the Vedic scholars. Different scholars hold different views on the nature of the deity: thus, Kühn, Hillebrandt, and Hardy regard him as the solar deity and they are justified by the fact that the name has been used to qualify the sun in several places. Ludwig considers him as a god of the year. Oldenburg regards him as a " pure abstraction expressing a definite characteristic activity" (*Vedic Mythology*, p. 117).

Considering *Tvaṣṭṛ* as a definite deity, as he is invoked in the Rigveda (apart from the term being used for the fire or the sun), we find that no definite idea can be had of his physical nature from the Rigveda alone. We may, however, form a definite idea of the deity from the fact that he has been identified with the brilliant star Spica (in the constellation of Virgo—*Kanyā*) in the Vedāngajyotiṣa. We shall now see how far we can appropriately interpret the various attributes of Tvaṣṭṛ if we identify him with the star Spica.

The Spica has been called the little lancet-bearer (Smyth's *Cycle of Celestial Objects*, Second Edition, 1881, p. 376); Tvaṣṭṛ holds an axe in his hand. The sign Virgo has been credited with the power of producing fruits and animals (*Ibid.*, p. 377). The star Spica has been called the ear of corn, grain, and seed in ancient times (*Primitive Constellations* by R. Brown, Vol. I, p. 65). Tvaṣṭṛ has also been credited with creative powers. Tvaṣṭṛ's cup is the moon's disk. The defeat of Tvaṣṭṛ by Indra can be well reconciled if we think of a period when the summer solstice (which is associated with rains and thunderstorms in

India—attributed to *Indra*) was passing through the constellation. Tvaṣṭṛ's generation of the fire can be understood when we find that the constellation Virgo is remarkable for the large number of nebulæ surrounding the Spica. In fact the constellation has been called "the field of the nebulæ (Rev. Charles Whyte's *Constellations and their History*, 1928, p. 127). The epithet that *Tvaṣṭṛ* is the "guardian of cows" may have something to do with the clouds or with the brightness of the star itself which has its figure in the form of a lamp or pearl. The nebulæ might have been referred to as the gods' wives. The waters evidently refer to the celestial waters—the milky way. The important evidence we possess is the statement that *Tvaṣṭṛ's* light has been obscured by the moon's disk. The Spica is a junction star (that is, it comes in conjunction with the moon): In consideration of these facts we may take *Tvaṣṭṛ* as the personification of the star Spica.

Lastly, as regards the story of *Saraṇyu's* marriage with the sun, we can identify *Saraṇyu* with *uṣā*, the morning. *Savarnā* with the daylight after the sunrise. The birth of the Aśvins simply means their appearance in the morning when the story was composed from actual observation.

B. Heavenly Dogs.

Dogs are mentioned in nearly all the Vedas. Although the earthly animals are distinctly meant in some passages, celestial objects seem to be indicated in others.

(1) *Saramā*. The name occurs in six passages and in one complete hymn (as a dialogue between her and the Panis) in the Rigveda. She has been described as one with strong legs (III. 31. 6). From the dialogue between Saramā and Panis (X. 108) we find that she was deputed by Indra as a messenger in search of cows kept hidden by the Panis under the mountains (X. 108. 7). She told them that Vṛhaspati, Soma, the stones for grinding the Soma plant, the sages, and the learned people had all come to know of the cows concealed by them and threatened them that they would be killed if they did not run away from the place (X. 108. 11). She had to cross a river (*Rasā*) to go to the Panis (X. 108. 2). Then Indra broke asunder the mountains and she discovered the cows (IV. 16. 8), where they were confined (I. 72. 8), by their lowing (III. 31. 6). After the cows had been discovered, Vṛhaspati killed the Panis and rescued the cows (I. 62. 3). Saramā (evidently for the services she rendered) got plenty of food and other articles from Indra (III. 31. 6) and the Angirasas for her son (I. 62. 3). Lastly, we are informed of the ceremonies performed by the Angirasas which proved successful and Saramā came to the place of sacrifice and saw the cows (V. 45. 7); we are also told that, on the advent of dawn, Angirasas met with the cows and there

was a proper pouring of milk over the place of sacrifice and Saramā was able to see the cows on the right path (V. 45. 8).

We do not find any reference in the other Vedic works.

In Nirukta (2, 24), Saramā is regarded as a 'bitch of the gods'.

Saramā is regarded by Max Müller (*Science of Languages*, 1882, Vol. II, pp. 513–6) as 'dawn' and the whole myth as a figurative description of a natural phenomenon of the morning. The cows, i.e. the suns rays or reddened clouds were concealed by the Panis, i.e. darkness. At dawn, Indra, i.e. the daylight appeared, fought with darkness, and released the cows. I am unable to accept this view, as it does not take into account such points as the giving of milk by the cows, and Saramā as the bitch of the gods. Further Indra cannot be taken to represent light. A better and more feasible explanation will be offered below.

We shall see that Saramā is the star Procyon of Canis minor. The name *saramā* is derived from *saraṇa* (Nirukta 2, 24) meaning 'one moving swiftly'. We have also mention of her strong legs. She has been called 'a bitch of the gods' and is comparable to the dog accompanying a hunter, a practice which holds good not only at the present time, but for bygone days as well. We know that the common and domestic animals had their place in heaven as constellation figures in ancient times. There is a passage in Taittirīya Brāhmaṇa (I. 5. 4) where it is said that Prajāpati created all animals and each of them occupied a star. Hence Saramā may be taken as a star (or a constellation) having the form of a dog or bitch. There is mention of three offsprings of Saramā (Sārameyas) or Dogs which will be discussed below.

Saramā is the mother of the Dogs and we have Procyon as the fore-dog. Saramā had to cross a river to go to the Panis. Procyon 'was supposed to have crossed the "Great Stream" as the Egyptians called the Milky Way, which now lies between him and his brother Canis Major, and hence he appears as "before" the Sirius-dog'. The Euphratian name of Procyon was *Kakkab Pallika* or *Palura* ('the crossing-of-the-water-Dog'). Again 'a circular "object of ivory" figured by Schliemann (Ilios, p. 601) shows a scorpion (probably with a part of the Milky Way[1]) in the centre, a Dog (male) on one side and a Dog (female) on the other'. (Brown's *Primitive Constellations*, Vol. I, p. 279.) Taking these facts into consideration, we may take Saramā to represent Procyon, the female dog. Rasā is the Milky Way. Further, we find in Mahābhārata that Saramā followed *Skanda* (the constellation figure of Orion) in his march. Procyon lies a little way off to the east of Orion and beyond the Milky Way (*Popular Hindu Astronomy*, by

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[1] **This is our insertion.**

Kālinath Mukherji, p. 51). This also leads us to the same idea.

The myth in my opinion seems to be nothing but a vivid representation of the natural phenomenon of the summer monsoon, the rainfall of the hot season attended with thunderstorm. Cows are clouds and their milk is rainwater. Panis were the demons of drought and Indra the god who caused the downpour. Vṛhaspati seems to be the planet Jupiter.

Lastly, we cannot accept the idea of Max Müller that Vedic Saramā is a remnant of Helena ; we rather think her to correspond with Hermes, the messenger of the god Zeus.

(2) *Śvan* (*Sārameya*). In the Rigveda, the animal is mentioned in connection with the Ṛbhus (I. 161. 13). It is said to awaken the Ṛbhus when they sleep in the abode of the sun at the end of a year. In another place (VII. 55. 2), the dog is addressed as a bright son of Saramā (Sārameya) who shows his tooth, which gleams like a lance's point within his mouth when he would bite. Lastly, we are told (X. 86. 4) that, while Indra protects the favourite Vṛṣakapi, the Dog, a pursuer of the boar (varāha), has bitten his ear.

In the Atharvaveda there are three passages which definitely refer to a celestial Dog (VI. 80. 1–3). They run thus: (i) He flees in the firmament observing all things. We adore the greatness of the Heavenly Dog with this offering. (ii) The three Kālakanjas are set aloft in heaven as they were Gods. I call all these to be our help and keep this man secure from harm. (iii) Your birth is in water, your station is in heaven, your majesty is on earth and in the ocean. We will adore the greatness of the Heavenly Dog with this offering.

It is quite clear from the above passages that the Dog is a heavenly luminous body ; further, her birth in water indicates that he is placed in the Milky Way. We have numerous references to a Dog-star Sirius in the astronomy of the West (Whyte's *Constellations and their History*, p. 232 ; Brown's *Primitive Constellation*, Vol. I, pp. 98, 99, etc.). Sirius lies in the mouth of the constellation *Canis Major*. I identify *Śvan* with Canis Major. One of the passages from the Rigveda above referred to (VII. 55. 2) agrees remarkably with one which we quote below from Aratos's Phænomenon (pp. 582–5) on Canis Major and its tooth-star Sirius. The passage runs thus :

> . . . .His portentious jaw
> Bears at the end a star which scorches most,
> Resplendent ; so men it the Scorcher call.

Comparing the two passages we may say that *Śvan* represents the constellation Canis Major and its *tooth* the star Sirius. As the terms 'constellation' and 'star' were very loosely used in ancient times and were interchangeable it is quite possible that Svan might have represented the Dog-star Sirius as well (see Brown's *Primitive Constellations*, Vol. I, pp. 278, 285). The boar, pursued by the dog, may be a constellation figure coinciding with the constellation Lepus chased by the Dog-star (Brown's *Primitive Constellations*, Vol. I, p. 97). Vṛṣākapi seems to be the constellation Orion (see p. 100).

We find mention of *Mṛgavyādha* in connection with a myth described in Aitareya Brāhmaṇa (3, 33). The story, told briefly, is that Prajāpati, lustful of his own daughter, followed her. She assumed the shape of a doe and Prajāpati transformed himself into a buck. He approached her. The gods, in order to prevent the evil consequences of this act, created a god, Bhuta vat from their own bodies. Bhutavān pierced Prajāpati with an arrow and, having done so, went up (that is, became a heavenly body). He was now named *Mṛgavyādha*; or the hunter of the deer. The female deer became the nakṣatra Rohiṇī. The arrow became three-knotted. It thus appears that Mṛgavyādha is a celestial body. It is mentioned as a star in Soma-siddhānta, Brahma-siddhānta, and Sūrya-siddhānta and its position, there given, makes it identical with the star Sirius. It is also known as *Lubdhaka*. Thus, whereas Śvan represents the constellation Canis Major, its tooth-star became later on known as Mṛgavyadhā or Lubdhaka, and is the Dog-star Sirius. The three knots of the arrow seem to be the three stars on the belt of Orion.

(3) *Yama's Dogs*. In the Rigveda there are two passages where we have mention of Yama's two dogs (X. 14. 10, 11). In the first passage, the dead is directed to go to the place of the two dogs, that are four-eyed and variegated in colour. In the second passage, the four-eyed dogs are mentioned as two messengers of Yama, guarding the path to his abode. In the Atharvaveda the same two passages are repeated (18. 2, 11, 12). There is a third passage (8. 1. 9) where Yama's dogs are called road-defenders.

Considering the physical nature of Yama (to be discussed) his Dogs must also be some celestial bodies. The two Heavenly Dogs known to the ancients have been identified with Saramā and Śvan, so that this pair must be some other body represented in heaven. As Yama's dogs remain as a pair and guard the path of the dead to Yama's abode, and as the dead fathers are the presiding lords of the asterism *Vicṛtau*[1] (the two Vicritas—stars λ and υ Scorpiones lying side by side), also known as Mūlā in astronomical works, we may take the two dogs of Yama as the two above-mentioned stars of the asterism Mūla. The name *vicṛta* means one which 'opens' or 'loosens' and thus the Vicṛitas may be openers of the gate of Yama's path. Now, why are Yama's dogs four-eyed? There was a Semitic myth that the 'solar Merôdakh had four divine dogs'; 'this number is not accidental, but represents the flow of light from the Diurnal-sun to the four quarters' (Brown's *Primitive Constellations*, Vol. I, p. 277). Here, too, the four eyes may refer to four quarters. The name Mūlā of the asterism (signifying one at the base or root) was perhaps given to it from the fact that the autumnal equinox was passing through it at this time and it thus formed the starting point of that half of the sun's path which lay to the south of the celestial equator. As the autumnal equinoctial point represents 'due west', we can easily determine the other directions from it. Thus the four eyes of Yama's dogs were recognised, looking at and pointing out the four directions.

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[1] Taitt. Sam. 4. 4, 10.

In this connection we may consider why the fathers are made presiding deities of the two asterisms, Maghā and Mūla (Taitt. Sam. 4. 4. 10). When the vernal equinoctial point was placed near the Pleiades (Krittikas), Mūlā used to rise at sunset and Maghā after midnight during the winter (near about the winter solstice). The period of bitter cold has the highest death-rate particularly among the aged. Further, the vitality of sick and debilitated people become more or less lowered at night, specially after nightfall and after midnight; and thus they become more susceptible to death at these two periods of time. Consequently, the rising of these two asterisms were thought to be inauspicious causing the death of the people. It is for this reason, in my opinion, that the dead fathers were made their presiding gods.

(4) *Kālakanjas.* We have already alluded to the Kālakanjas in a passage of the Atharvaveda (6. 80. 2). Although nothing more is found here, we have a story about them in Taittiriya Brāhmaṇa (1. 1. 2. 4–6). The story runs thus: There were *asuras*, *Kālakanjas*, by name. They built a fire-altar in order to gain the world of heaven. Every man added a brick to it. Indra, in the disguise of a Brahmaṇa, put a brick on for himself saying 'this is *citrā* by name'. They climbed up to heaven. Indra, however, pulled out his brick and they fell down and became spiders. Two of them flew up and became two Heavenly Dogs. The same story is narrated in Śatapatha Brāhmana (2. 1. 2. 13–17) in a slightly different form. The name of the altar is given here as *Rauhiṇa*. There is also an allusion to this story in the Rigveda (II. 12. 1), where Indra, the thunder-holder, is said to have rent the Rauhiṇa into pieces, when climbed (by the asuras) to get to heaven. Now, there are two stars, a little way to the north of Citrā (Spica) which are named Asterion and Chara, forming a small constellation, Canes Venatici, introduced by Hevelius in the 17th century. There is a star cluster near the southern edge of the constellation. The constellation is illustrated as two greyhounds held by a leash in the hand of Bootes (another neighbouring constellation). (Whyte's *Constellations and their History*, p. 163.) The

two Kālakanjas who flew up and became dogs may be the two hounds representing the two stars of the constellation (K. Mukherji's *Popular Hindu Astronomy*, p. 53). The star cluster may be made to represent the spiders. It is, however, remarkable that the myth of the Ancient East should be explained by a new constellation that was erected as late as the 17th century; this may be a simple coincidence, or Hevelius may have had his materials from the East.

The import of the myth is very obscure. The formation of a *fire*-altar gradually built up and its sudden breaking down suggest to us the gradual approach of a comet and its disruption. Such an event has been more than once witnessed by modern astronomers. The agency of Indra in its renting into pieces and the formation of one of its bricks by Citrās make me believe that such a disruption, if it actually took place, must have occurred close to Citrā with the summer solstice passing nearabout.

C. *Deities connected with Lunar Asterisms.*

1. *Aryaman.* The deity has been invoked some seventy-seven times. He is closely associated with Mitra and Varuṇa, as the latter (two) deities have been invoked sixty-six times with Aryaman. Indra has been praised eleven times with him.

In spite of the fact that Aryaman has been praised in so many places, very few of his characteristics have been revealed to us. He has a milk-giving cow (I. 139. 7). He becomes a benefactor with the help of Fire (I. 141. 9) and protects the honest like Fire (I. 186. 2). He takes the side of (that is, supports) Fire's daughter (V. 3. 2). He is one of the sons of Aditi (I. 41. 3–7; V. 67. 1). Aryaman, Mitra, and Varuṇa remain always associated with one another (VIII. 26. 11) and protect (us) together (VIII. 27. 17). Their works are of the same nature (II. 27. 2). They praise the sun in association with Aditi (VII. 38. 4). They have created the autumn (year), month, day, night, sacrifice, and ṛks (VII. 66. 11). Again we find that Aryaman has been praised for providing a new wife, once with Bhaga (X. 85. 23) and once with Bhaga and Savitṛ (X. 85. 36). Soma has been compared with Aryaman and Mitra and Varuṇa.

The name of Aryaman occurs in Vājasaneyisaṃhitā, the passages being mostly quoted from the Ṛigveda. In Taittirīya Saṃhitā we are told that Aryaman, Mitra, and Varuṇa hold the three worlds and the three heavens (2. 1. 11). Again he has been identified with the sun (2, 3, 4). In Atharvaveda, Aryaman has been invoked for benefit in general, to prevent ill-luck, in marriage ceremonies (XIV. 1, 50; XIV. 2, 13), to provide a wife or husband (VI. 60. 1), to remove ill omens on the part of a woman (I. 18. 2) and in the *mantras* for an easy delivery (I. 11. 1). He has again been called the grandfather of lac (lākṣā) (V. 5. 1).

In Taittirīya Brāhmana (2, 3, 5. 4) Aryaman has been called the sacrificial fire (*Yajña*); again he has been said to be provided with beasts (3. 1. 4. 9). In Śatapatha Brāhmana (5. 5. 1, 12) we are told that the path of Aryaman is placed above the high directions (regions) of Bṛhaspati.

In Ārcajyotiṣa (sl. 14, 25) and Yājuṣajyotiṣa (sl. 18, 32), Aryaman is regarded as the lord of Uttaraphālgunī nakṣatra (the junction-star being β Leonis). In Pitāmaha-siddhānta and Vṛddhavasiṣṭha-siddhānta (8, 18) we find the word 'aryaman' in place of Uttaraphālgunī.

Aryaman (as Airyēmā) has been praised in the Avesta. Thus, in Vendidad (20, 24) he is said to have produced evil corruptions in the bodies of men; further (20, 26) he is invoked to give joy to men and women of Zarathustra. Again (22, 23) we get the mention of the dwelling of Airyama; he is asked to heal (the sick person) (22, 25); he is also called lustry (22, 52). We find prayers for him in Yasna (53. 1–3) and Khordah-Avesta (18. 2. 2, 7).

We do not get any definite views from the oriental scholars of the physical nature of the present deity. According to Sāyaṇa (in his commentary on I. 90. 1) he is the sun who is the lord of the division into day and night; again, in another place, he calls him the deity of the junction of the day and night. Considering Mitra and Varuṇa as the day and night, Satyabrata Sāmaśrami (a commentator on the Rigveda) considered the sun before midday as the present deity.

The Uttaraphalguni nakṣatra forms one-third of the sign Leo and two-thirds of the next sign Virgo. The sign Leo, was named A-rū in the Euphratian list and Aryiah in Hebrew (Brown's *Primitive Constellations*, Vol. I, p. 62). There seems to be every probability of the identity of A-rū and Aryiah on one hand and Ārya on the other. Further the term *aryaman* may be made to mean 'one forming (or having) the lion'. In ancient times the sign held a close relationship with the sun (Whyte's *Constellations and their History*, p. 121). Whyte holds that the place of the sun at the summer solstice was in this constellation at the time the star groups were recognised (p. 120). Again, the sun is the presiding deity of the sign Leo. All these facts help to explain why Aryaman has been made to represent the sun. The Fire with which our deity is connected in some of his attributes probably represents the sun (the celestial fire). The 'daughters of fire' are probably the brilliant stars, as α, γ, ∂ Leonis, etc. in the neighbourhood. The sign Leo is probably meant by calling him one 'provided with beasts' (or probably the lord of beasts).

We have seen that Aryaman, Mitra, and Varuṇa are praised together in a large number of hymns and that it is distinctly stated that they are always associated together. We come to know from the ancient astronomical works of the Hindus (Yājuṣajyotiṣa, sl. 10, 33, 34; Ārcajyotiṣa, sl. 9, 26, 27; Pitāmaha-siddhānta; Brahma-siddhānta 2. 174; Soma-siddhānta 4. 6, 34; Sūrya-siddhānta 8. 18) that Mitra is the presiding deity of Anurādhā (the junction-star of which is β or δ scorpionis) in the sign Scorpio and Varuṇa the lord of Śatabhiṣā (the junction-star of which is λ Aquarii) in the sign Aquarius. Thus the reason why they are closely associated seems to be due to the fact that the three asterisms could be seen as the same at night. We know that Anurādhā is placed at about a distance of 77° from Uttaraphālgunī and Śatabhiṣā at about a distance of 170° from the latter, and thus they together occupy less than half the circle of ecliptic (360°). Thus arranged, the three asterisms could be seen together above the horizon during some part of night for more than five months continuously.

We also find that the deity is connected with matrimonial ceremonies and that the attributes referred to in the Atharvaveda and Avesta are all related to the spring. Now spring extends for three months from the vernal equinox to summer solstice in the counting of four seasons or two months thereabout (or ending in the summer solstice) in the counting of six seasons. We find, that Spica (Citrā) in the sign Virgo (placed behind Leo) used to be held as the spring star by the Chinese in ancient times (Whyte's *Constellations and their History*, p. 124); and we have already referred to the position of the sun in Leo in the summer solstice in ancient times (the summer solstice being placed in the beginning of the sign Leo about 4,500 years ago). We thus see why the deity in his attributes is connected with spring.

Having seen that the summer solstice was placed near the asterism at the time when the observations were made, we can easily explain his 'milk-giving cow' as the 'rain-giving cloud' and his leadership in the giving of water.

Thus we may take Aryaman to represent Uttaraphālgunī or its presiding deity. Perhaps he is also more or less related to the winter solstice.

2. *Dhātṛ*. This deity has been mentioned about nine times in the Ṛigveda. In one place (X. 82. 2) Viśvakarman has been called *dhātā*, evidently meaning creator (or supporter) of the universe. We also find him invoked with Indra and Vidhātṛ, but oriental scholars take Dhātṛ and Vidhatṛ to qualify Indra (X. 167. 3). He is said to have created, in proper time, the sun, moon, heaven, sky, and earth (X. 190. 3). Again he has been called the creator (supporter) of the creators (supporters) and the lord of the world and the protector (trātṛ) (X. 128. 7). Then again, he has been invoked to be propitious to the sages (VII. 35. 3), to give protection to the eyes with Savitṛ and the Mountain (X. 158. 3); and to support the gravid

womb of women (X. 184. 1), while Viṣṇu is asked to make the women fit for conception, Prajāpati to make the semen discharge, and Tvaṣṭṛ to develop the fœtus. Lastly, he has been invoked in the marriage ceremony to give affection between the married couple (X. 85. 47).

In White Yajurveda, the deity has been mentioned about five times. Once he has been called liberal (8, 17) and in another place (17, 26) he has been designated as mighty in disposition.

In Black Yajurveda, Dhātṛ has been mentioned for some thirteen times. He has been called a giver (1. 4. 44). He is said to have established the fire and represent the year (1. 5. 1). Dhatṛ with six syllables won the six seasons (I. 7. 11). He is the lord of the offspring and wealth, and is the ruler and creator of the world (3. 3. 1). Again, he is the lord of food and gives food to the baby as it is born (5. 3. 4). We are also informed of his lordly power (3. 3. 10). Lastly, we find him invoked in connection with various sacrifices and he has been bestowed with various offerings.

Dhatṛ has been invoked nearly forty times in the Atharvaveda to grant all sorts of benefits. Thus he has been prayed for general well-being (XIX. 10. 3), for peace and prosperity (XIX. 9, 12), for prosperity with *Uḍumbar* (fig.) amulet (XIX. 31. 3), with Rati and Savitṛ for power (III. 8. 2), for wealth (VII. 18. 2–4), for long life (XVIII. 4, 8), with Vāyu, Indra, and Savitṛ for continued life (VIII. 1. 15), and with Vidhatṛ, Savitṛ, etc. for protecting the sacrifice from *nirṛti* (perdition) (V. 3, 9). He has been begged to untie the skin-bag of the water of heaven (VII. 18. 1). He has also been invoked for defence against witchcraft (VIII. 5. 18), against *arbudi* (varicose veins ?) (XI. 11, 25) and to heal a wound and reduce a dislocation (IV. 12. 2). Again, he has been prayed to kill the enemy (X. 6, 21) and to protect in war (XIX. 20. 1). We find him invoked for getting a good husband for a woman and a good wife for a man (VI. 60. 3), in marriage ceremonies with other deities (XIV. 1. 33, 34 ; XVI. 2. 13), for successful conception (V. 25. 4, 5), and for progeny (VII. 20. 1). He has again been invoked in the *mantras* for funeral ceremonies, where he has been asked to protect the dead from perdition from the southern quarters, while Indra and Maruts have been prayed to protect him from the eastern, Aditi with Ādityas from the western, and Soma with all the gods from the northern quarters (XVIII. 3. 25–28) ; he has also been asked to maintain the dead aloft (XVIII. 3. 29). In addition, we know some of his characteristics from the Atharvaveda. Thus, he has been called the maintainer (XVIII. 3. 29), master, and lord of the moving creation (VII. 18. 1). He sustains the earth, sky, and the sun (VI. 60. 3). Again, in a hymn (IX. 12) where the various parts of the body of an ox and its various postures have been assigned to various deities, the knee-joint has been attributed to Dhātṛ (IX. 12. 10); it has also been stated that the ox is Agni when sitting, the Asvins when arisen, Indra when standing eastward, Yama when standing southwards, Dhātṛ when standing westward, and Savitṛ when standing northward (IX. 12. 20, 21). Lastly, we are told that at the beginning of creation Dhātṛ was unborn (XI. 10. 5) and that he was born Dhātṛ (XI. 10. 9).

In the Brāhmanas, several deities have been qualified as *dhātā* (perhaps with reference to the protective or supporting influence): thus Prajāpati (Śat. Br. 9. 5. 1–38), the sun (Ait. Br. 3. 48), the Fire (Taitt. Br. 3. 3. 10. 2), the moon (Ṣaḍv. Br. 4. 6; Gop. Br. 1. 10), and the earth (Taitt. Br. 3. 8. 23. 3), have been so qualified. The year (Taitt. Br. 1. 7. 2. 1) and Death (Taitt. Br. 3. 12. 9. 6) have also been called *dhata*. In some Brahmanas (Tāṇḍya, 24. 12. 4; Taitt. 2. 6. 19. 1-2) Dhātṛ has been regarded as one of the Ādityas.

In the Naighaṇṭuka (5. 5), Dhātṛ has been enumerated with the gods of the middle region. In Nirukta (10. 26. 1) he has been described as the generator (or ordainer) of all beings.

The word is also found in the earlier astronomical works of the Hindus. The term is used for the *Uttaraphālguni nakṣatra* in Ārcajyotiṣa (sl. 9) and Yajuṣajyotiṣa (sl. 10). Somākara, the commentator, takes the word to mean Yama. Again Aryaman has been stated to be the two *Uttaraphālgunis* or their presiding deity in the same two works (Ārcaj. sl. 9, 14, 25; Yāj. 10, 18, 32) as well as in Pitāmaha-siddhānta and Vṛhad-vasiṣṭha-siddhānta (8. 18).

Nothing definite is said regarding the physical nature of the deity by the oriental scholars, except that he is regarded as the creator in general.

From the study of Dhatṛ we find that, whereas he developed into a pre-eminent deity during the Vedic period, he merged into oblivion in the Brahmanic times. Considering the Vedic age, we find in the Rigveda that he has been regarded as a creator of the world and invoked to support the earthly beings mainly in the way of giving them progeny. In the Yajurvedas, his field of gift has been further extended as a sustainer by food and wealth throughout the year. Lastly, in the Atharvaveda, we find him invoked for all sorts of gifts, in fact for all sorts of well-being and prosperity not only for the living but also for the soul of the deceased. Thus he has been regarded as a supporter and sustainer of the world and earthly beings. In the Brahmanas, he has almost lost his significance as a distinct personage. All the various deities have been qualified as *dhata* (or supporters of the world).

From the above considerations I am led to the belief that, originally considered as a creator and then as a supporter of the world as well, he was later on forgotten as such; and, as we shall see, Prajapati came into pre-eminence in his place.

I shall now try to explain why he was identified with the nakṣatra *Uttaraphālgunī* (in the singular) and why Aryaman later on replaced him and became the presiding deity of the same nakṣatra now mentioned as *Uttaraphālgunau* (in the dual).

Taking at least some of the characteristics of the deity that we find in the Vedas, we may perhaps consider the period of his benevolent works as related to the end of the spring (or beginning of the summer) and at the time of summer solstice, during which period the brilliant star β Leonis seemed to rise regularly in the early morning. It is for this reason that the star was identified with the deity. As the deity failed to be recognised later on, the lordship or identity was transferred to another deity, Aryaman.

We may also set forth an explanation why the same nakṣatra is used in the singular and dual in two places.

The asterism Uttaraphālgunī is made to consist of two stars, the brilliant β Leonis, placed near the ecliptic, and 93 Leonis, a less brilliant star and placed further north at a distance from the ecliptic. It seems to me that at the period when the asterisms were first recognised the lower star β Leonis placed close to the ecliptic was alone taken to represent the asterism, as the other was at a great distance from the equator. Later, when the equator, owing to the precessionof the equinoxes, came closer to the asterism, the upper star, now comparatively nearer to the equator, was also taken into account and now the asterism was made to comprise the two stars. Although all the astronomical works recognise the above two stars in the asterism, one of them (Jyotiṣasāra) recognises only a single one, thus adhering to the old idea.

In this connection we may briefly discuss the deity Vidhātṛ. The name of this deity occurs twice in the Rigveda (VI. 50. 12; IX. 81. 5) as a distinct personality, where he has been invoked along with several other deities. In two other places (X. 82. 2, 3) Viśvakarman has been designated as *vidhātā* or disposer (of the world). In the White Yajurveda the term is found twice as an attribute of Viśvakarman (17. 26-7) and once of Agni (32. 10). In the Atharvaveda the name occurs thrice as a distinct deity and he has been invoked for various purposes (III. 10. 10; V. 3. 9; XIX. 37. 4). Vidhātṛ as a distinct deity does not appear in the Brahmanas, although in one place (Gop. Br. Utt. 1. 10) the moon has been called *dhātā* and *vidhātā*. Hence we may conclude that Vidhatṛ also fell into disregard as a distinct deity in the Brahmanic times. Evidently he took a less prominent part than Dhātṛ.

3. *Pitaraḥ*. The term has been used in the Rigveda more than fifty times to mean forefathers or ancestors. Again the words *pitarāṃ* and *pitaraṃ* are found to occur some fifteen times for the heaven and earth. Lastly, we have one complete hymn

(X. 15) and some ten or more passages in which are invoked deities collectively known by the above name (pitaraḥ).

We find a number of characteristics of the deities in the Rigveda and that some of them are repeated in the other Vedas. They have been qualified as high or highly-placed (*parāsa*), middle or belonging to the middle region (*madhyama*) and low or belonging to the lower region (*avara*) (X. 15. 1); they have also been said to be foremost (eastern) (*pūrvāsa* or *pūrva*) (X. 15. 2, 8, 10), uppermost (*uparāsa*), as remaining on the earth, in the dust (atmosphere) and in the heaven (*vikṣu*) (X. 15. 2); further, they are said to reside near the ruddy one (*aruṇī*) (X. 15. 7) with the Devas (X. 15. 9), remain satisfied by themselves in the heaven (X. 15. 14), and ride on the same chariot as Indra and Devas (X. 15. 11). They have been referred to as known, unknown and as present in the sacrifice or not (X. 15. 13). They are stated to have once offered the Soma libation (Somyāsaḥ) and to be fond of Soma (X. 15. 1, 5, 8). Some of them are stated to have been fire-burned and others not so (X. 15. 14). They have been regarded as self-luminous (svarāṭ) (X. 15. 14) and as pervaded with fire (X. 15. 11). They have been said to be propitious, composers of hymns, truthful, intelligent, and performers of sacrifice (X. 15. 9, 10). In this connection we get several names, viz. Kavyas (X. 14. 3), Angirases (X. 14. 4, 5), Atharvas (X. 14. 6), Bhṛgus (X. 14. 6), and Vasiṣṭhas (X. 15. 8), evidently the names of deceased persons of the respective families regarded as the Pitṛs. The Pitṛs have been requested to sit on the south of the place of the sacrificial fire (X. 15. 6) and have been invoked for happiness (X. 15. 4), protection (X. 15. 4, 5), riches (X. 15. 7, 11), and that they may not be offended by defects (in the sacrificial ceremonies) (X. 15. 6).

The deities have many times been referred to in the White and Black Yajurvedas, both in original passages and in hymns borrowed from the Rigveda. In the White Yajurveda they have been called the ' heavenly folk ' (3. 55) and are said to live in Yama's realm (19. 45). They have been invoked as heroes, conquerors of armies, etc. (29. 46), and again for a good, brave son (2. 33) and for various other gifts. In the other work they have been eulogised many times in connection with various sacrifices. They have been said to guard Agni Āngiras on the south with the swiftness of the wind (I. 2, 13). The world where the Pitṛs sit is pure (1, 3. 1, 6). In many things they seem to be opposed to the gods.

The Pitṛs have been invoked many times in the Atharvaveda. Many deceased sages seem to have been invoked as Pitṛs (XVIII. 3. 16, 20). They have been said to represent the arrows of the southern quarter (III. 27. 2). Yama has been called their overlord (V. 25. 14; XVIII. 2, 25). They have been invoked in marriage ceremonies for protecting the bridegroom and bride and for progeny (XIV. 2, 73). They have been praised several times in connection with funeral ceremonies: Thus, they have been requested to come on the south (XVIII. 1, 42); the deceased person has been said to get a place among the Pitṛs (XVIII. 2, 25; XVIII. 4, 64; etc.). We hear of Pitṛs that sit on the earth, in the atmosphere, and in the sky (XVIII. 4. 78–80). Again, we have a passage where the lowest heaven is called watery, the mid-heaven starry, and the fore-heaven, third one, the abode of the Pitṛs (XVIII. 2, 48).

We have numerous references to the Pitṛs in the Brahmanas. They have been regarded as gods (Kauṣ. Br. 5. 6; Gop. Br. 1. 24). They are invisible to man (Śat. Br. 2. 4. 2. 21; etc.). They reside in the south (Taitt. Br. 1–6. 8. 5; Ṣaḍ. Br. 3. 1; etc.), in an intermediate quarter (Śat. Br. 1. 8. 1. 4; 2. 6. 1. 10, 11; etc.) and in the third sky (Tāṇḍya Br. 9. 8. 5; Taitt. Br. 1. 3. 10. 5; 1. 6. 8. 7). Their home, the *pitṛloka*, is placed below (*adha*) (Śat. Br. 14. 6. 1. 10) and its gate is situated on the south-east corner (Śat. Br. 13. 8. 1. 5). Three grades of Pitṛs have been recognised: *Somavanta* (connected with Soma), *Varhiṣadaḥ* (seated on Kuśa grass), and *Agnisvātta* (pervaded with fire) (Śat. Br. 5. 5. 4. 28; 14. 1. 3. 24). Soma, again, has been called the lord of Pitṛs (Śat. Br. 3. 2. 3. 17). The Pitṛs have been regarded as the subjects of Yama (Śat. Br. 13. 4. 3. 6; etc.). The world of the herbs belongs to the Pitṛs (Śat. Br. 13. 8. 1. 20). Again Maghā (one of the lunar asterisms) has been said to belong to them (Taitt. Br. 1. 5. 1. 2; 3. 1. 1. 6).

As just mentioned, we find that the nakṣatra Maghā has been called Pitṛ in Vṛhatvasiṣṭha-siddhānta (8. 21), Soma-siddhānta (4. 6. 34), and Sūrya-siddhānta (8. 18); again, the Pitṛs are regarded as the lords of Maghā in Yājuṣajyotiṣa (sl. 32) and Ārcajyotiṣa (sl. 25).

There is not the least doubt that the Pitṛs or Fathers represent the dead ancestors or their departed souls dwelling in the heaven.

The Pitṛs are characterised by their intimate connection with Yama, who is their overlord and of whom they are subjects. Their place has been assigned to the south. Lastly, they are connected with the asterism Maghā. We shall now see how we can reconcile these statements. We find in Viṣṇupurāṇa (II. Ch. 8) that in ancient times the sun's northward shifting (*uttarāyaṇa*) used to begin in the sign Capricorn and end in the sign Gemini and that his southward movement (*dakṣināyana*) used to begin from the sign Cancer to end in the sign Sagittarius. Thus we know that the summer solstice was placed at the end of Gemini or nearabout and the winter solstice at the end of Sagittarius. We are again told that the path of the Pitṛs is known as Mṛgavīthi, which comprises the asterisms Śravaṇā, Śatabhiṣā, and Pūrvabhādrapada. Sravaṇā forms the middle portion of the sign Capricorn. Śatabhiṣā and one-fourth of Pūrvabhādrapada form the next sign Aquarius. Strangely enough we find that the asterism Dhaniṣṭhā which is placed between Śravaṇā and Śatabhiṣā is missing here. We do not know whether it was omitted by an oversight or was not counted at the time owing to its smallness in size. In any case we come to know that the path of the Pitṛs used to begin with the winter solstice and end in the vernal equinox. This part of the year forms the coldest period and the death-rate, particularly of elderly persons, is highest at this time. As Yama is the god of death, it is easy to understand why he has been regarded as the lord of the Pitṛs and the Pitṛs as his subjects. Their abode in the south is easily explained when we note that the winter solstice is the southernmost point of the ecliptic with reference to the celestial equator. As regards their connection with Maghā, one cannot definitely say how the idea actually arose. We can only find that when the sun used to come to the winter solstice, placed at the end of the sign Sagittarius or the beginning of Capricornus, the asterism Maghā used to appear in the heaven at night. This is why (it may be suggested) the Pitṛs were made the lords of the asterism, the junction star of which, viz. Regulus, is the largest and most prominent star in the heaven. One cannot consider that the winter solstice was placed near the asterism Maghā, since this would carry us back to 15000 B.C., a date which is not warranted by other evidences.

4. *Bhaga.* The term occurs about one hundred and twenty times in the Rigveda. The term seems to refer to the deity about seventy times or so; elsewhere it has been used for fortune or wealth, or used as qualifying Fire, the Sun or Puṣaṇ, having the significance of distributor (of wealth). In many passages we cannot be sure whether we are dealing with the deity or with the word used in the above sense. In spite of the fact that he has been invoked so many times, we can deduce very few attributes of the deity. He is one of the Ādityas (I. 14. 3; VII. 41. 1). We hear of his chariot (X. 64. 10; X. 93. 7) as in the case of many other deities. He is brilliant (II. 31. 4; V. 32. 5); he spreads his rays (I. 144. 3); we also know the rays of his eyes(?) (II. 136. 2) and his splendour (X. 68. 2). He is called the distributor (VII. 41. 2) or the dispenser (V. 46. 6). He is invoked in marriage ceremonies with other deities (X. 85. 23, 36). We hear of his path (III. 54. 14). Dawn is his sister (I. 123. 5).

The word occurs some ten times in the White Yajurveda. The deity is meant on some four occasions, but the word is used in other places for wealth, bliss or fortune. In the Black Yajurveda, the deity has been thrice invoked.

The word is seen some sixty times or more, in the Atharvaveda, referring to the deity about forty times. In the remaining places the term is used in the sense of fortune, splendour, enjoyment and perhaps in two passages (I. 14. 1, 4) for the female external organ of generation. The deity has been eulogized in the mantras for marriage ceremonies (XIV. 1. 20, 50, etc.) with several other deities and for increase in progeny (XIV. 2. 13). He is formidable (III. 16. 2) and remains in the night watch (VI. 21. 2). He is asked to deepen the ploughing (III. 12. 4).

Yaska, in his Niruktā (12. 13), regards him as the presiding deity of the forenoon.

Bhaga is regarded as the presiding deity of the asterism Purvaphālgunī (consisting of two stars, ∂ and θ Leonis) in Yājusajyotiṣa (sl. 18, 32), Ārcajyotiṣa (sl. 14, 25), Pitāmaha-siddhānta, and Vṛhatvasiṣṭha-siddhānta.

Oriental scholars regard Bhaga 'as a god in general' of the Indo-European period, as the word occurs in the Avesta as *bagha*, signifying 'god' and also in old Church Slavonic as *bogü*, having the same significance. The term 'cannot have attained a more specialized sense than 'bountiful god' if indeed it meant more than merely 'bountiful giver' (Macdonell's *Vedic Mythology*, p. 45).

I am inclined to believe that the deity gained a specialisation in the Vedic times. The significance of the word bhaga as fortune or wealth, and the eulogies of the deity in connection with the deepening of ploughing and, lastly, his connection with the asterism Pūrvaphalgunī, either as the asterism itself or as its presiding deity, lead one to the same view. The fortune or wealth of the sages in the Vedic times principally consisted of crops of barley (perhaps wheat as well), which grow only in the high lands of the Punjab and United Provinces in the cold weather. When the vernal equinoctial point was passing through the end of the sign Taurus or beginning of Gemini, the asterism Uttaraphalgunī used to rise at the end of night towards the dawn during spring when the crops used to ripen. Hence if we take the asterism to represent the deity either by itself or as its presiding lord, we have a distinct deity in Bhaga on whom used to depend the fortune of the sages according as they had a good crop or not. This, being the best and suitable period of the year, free from heat, cold and rain and with plenty of provisions, used to be selected for marriage ceremonies. The few characteristics of the deity that we know can be well accounted for if we accept this view.

5. *Yama.* The word occurs some fifty times in the Rigveda. It is used in the significance of 'restrainer or controller' in some seven passages occurring in the first (I. 66. 4; I. 73. 10), second (II. 5. 1), third (III. 27. 3), fifth (V. 61. 2), seventh (? VII. 33. 9), and eighth maṇḍala (VIII. 24. 22); in one place (X. 8. 4) the term *Yamayoḥ* is used for a pair. Elsewhere the term indicates the deity under consideration.

One complete hymn (X. 135) is dedicated to him. He is also invoked or otherwise mentioned in scattered passages. There is also one complete hymn (X. 10) for Yama and Yamī consisting of a dialogue between them. The name of the deity occurs only in the first, ninth, and tenth maṇḍalas, by far the largest number being found in the last.

Yama is sometimes addressed as Vaivasvataḥ, the sun's son (IX. 113. 8; X. 14. 1; X. 58. 1; etc.). He is closely connected with Agni, who is a friend of Yama (X. 21. 5) and is his priest (X. 52. 3). Again, Agni protects the goodwill of Yama (X. 12. 6). He is also associated with Varuṇa, both addressed as the king, as the dead man meets the forefathers, Yama and Varuṇa together (X. 14. 7). Yama's foot-fetter is said to be parallel with the bond of Varuṇa (X. 97. 16). In one passage (I. 164. 46) Agni, Yama, and Mātariśvān are said to be the names of one being (perhaps the sun). We are also told that Mātali (Indra's charioteer) grows (prospers) with Kavyas, Yama with the Angiras, and Vṛhaspati with the Ṛkhas (X. 14. 3). He has also been invoked with several other deities (X. 64. 3).

Yama has been addressed as a king (X. 14. 1). His birth is not attended with death (I. 83. 5). War is pleasant to him (I. 116. 2). He is the representative of death (X. 165. 4). Death is his path (I. 38. 5). He builds up the dwelling for the dead (X. 18. 13). Everybody goes to him (X. 14. 1). The dead man is asked to go by the same path and to the same place as his forefathers did and meet Yama (X. 14. 7); he is again asked to meet the fathers and Yama in the heaven (X. 14. 8). Yama carries the good men to the place of happiness and clears (their) path (X. 14. 1). The place he assigns to the dead is displayed day and night and is full of waters (X. 14. 9). Again, the mind (soul or life) of the dead goes to Yama at a great distance (X. 58. 1). Yama has been requested to grant clear (*bhadra*) eyes (X. 164. 2).

Yama has two messengers as two dogs, the sons of Saramā. Each of them is four-eyed, variegated, broad-nosed, insatiable, and mighty (X. 14. 10–12). Again, the pigeon (*kapota*) is his third messenger (X. 165. 4).

We have a detailed account of Yama's residence. In short, it is placed in the third heaven (IX. 113. 8), the two other heavens (regions) being close to the sun (I. 35. 6). It is also illuminated with light (IX. 113. 7, 9), and is immortal (place of immortality), and indestructible (IX. 113. 7). There is a gate in the heaven leading to his abode and there are large streams in his place (IX. 113. 8). There is the place of *Bradhna* (the root of everything—Brahman or the beginning of the year ?) (IX. 113. 10). There are all sorts of pleasure and satiety (IX. 113. 11).

Trita is said to have yoked Yama's horse and Indra to have been the first to ride on it (I. 163. 2). The sacrificial horse is said to represent Yama, Āditya, and Trita (I. 163. 3).

Lastly, in the dialogue between Yama and Yamī (X. 10), they call themselves children of Gandharva and the water nymph. Yamī wanted to have sexual union with Yama, her twin brother, but Yama rejected the proposal.

Yama's name is found in some twenty-five places or more in the White Yajurveda. No further information is found here. He has given a place on the south for the comers (that is, the fathers) to rest in (12. 45). Yama remains in the highest heaven along with Yamī (12. 63).

Yama has many times been invoked in the Atharvaveda. What we have already seen in the Rigveda is more or less repeated here. Yama is the overlord of fathers (5. 24. 14); he makes seats for the fathers (18. 3. 52). He is the master of bipeds and quadrupeds (6. 28. 3). He is provided with arrows (12. 3. 56). He was the first of mortals, who died and went to that world (18. 3. 13). Death is his messenger (18. 2. 27). He is the father of sleep (6. 46. 1); sleep is the agent of Yama (6. 46. 2; 16. 5. 1) and is the instrument of Yama (19. 57. 3). In a funeral verse (18. 3. 66), we are told of an eagle in the firmament, golden winged messenger of Varuṇa, busy bird in the lair of Yama.

There are some references to Yama in the Brahmanic literature. The southern quarter belongs to Yama (Śat. Br. 14. 6, 9, 22). Anurādhā, the first, and Apabharaṇī, the highest, are the two asterisms of Yama (Taitt. Br. 1, 5. 2, 7). The earth is Yamī (Śat. Br. 7. 2. 1, 10).

According to Yājuṣajyotiṣa (sl. 34) and Ārcajyotiṣa (sl. 9), Yama is the presiding deity of Bharaṇī, which is named Yamalā in Somasiddhānta (4, 6, 7).

Yama and Yamī correspond to Yima and Yimeh of the Indo-Iranian period. Yima, as a god, is found in the Avesta. He is beautiful and is the owner of a good flock (Vendidad II. 4). He is the son of Vivanhās (Sun), as the recorder and bearer of the law (Vend. II. 8). He enlarged the world of Ahura Mazda, made it fruitful, and obeyed him as a protector, nourisher, and overseer of the world (Vend. II). Yimeh is mentioned in the later Iranian literature (Spiegel, *Eranische Altertumskunde*, I, p. 527), as the sister of Yima, who, with her brother, formed the first human couple.

The physical nature of the deity has been fully discussed by oriental scholars (see Macdonell's *Vedic Mythology*, p. 173). I shall first consider the deity in his relation with the dead and then the twins, Yama and Yamī.

In spite of the diverse opinions of the scholars, there is no doubt that Yama is intimately connected with the dead and that people reach his kingdom only by death. Let us see what led to the idea of the god of the departed. Although death is a natural phenomenon in the living world, still the loss of people, sometimes in numbers, as in an epidemic, was keenly felt. Further the death of elderly people was regarded as a heavy loss to the community. Under these circumstances they were obliged to look for some preventive measures and were thereby led to think of some supernatural (divine) power as an agent in the causation of death, an obeisance to whom might give some relief. This ultimately led to the conception of a presiding god of death. Such an idea is well revealed in the passages of the Vedas. The idea was also current that Yama was the first mortal who died and went to heaven. We know that the greatest number of deaths, specially of elderly people, occur in the winter and to a less extent in the autumn.. These two seasons in the north-west region of India more or less correspond to that part of the year which is included between the autumnal equinox and vernal equinox through the winter solstice. We have seen above (in the Taitt. Br.) that Anurādhā and Bharaṇī are the two asterisms of Yama. Anurādhā is called the first and Bharaṇī is called the highest (*uttama*); they are placed at a distance of about 190° from each other. This evidently indicates that the influence of Yama on death was particularly manifested in that part of the year which was placed between the risings (in the early morning) of the two asterisms. The origin of this idea will be understood, if we think of a time when the autumn equinox was near Anurādhā and the vernal equinox near Bharaṇi. Again, as this half of the ecliptic falls to the south of the celestial equator, the southern region of the heaven is assigned to Yama. Varuṇa's seat near Yama's is also explained when we remember that Satabhisa, the presiding deity of which is Varuṇa, is placed within 90° of Bharaṇi, between it and Anurādhā. Yama's friendship with Agni no doubt refers to the agency of the latter in burning the body before the dead can go to Yama. The two dogs of Yama seem to be the two stars of Mūlā (Vicṛtau) (which we have already discussed). The pigeon of Yama, however, can only doubtfully be identified with the constellation Columba, as 'it is supposed to have received its name as early as the 16th century' (Whyte's *Constellations and their History*, p. 242). It is, however, possible that it was recognised in the Vedic times. Yama's horse, again, may be the constellation figure of Pegasus. The streams in the neighbourhood of his abode and the plentiful supply of water in the places that he assigns to the dead are indications of scarcity of water elsewhere; they are referable to the portion of the milky way in the signs of Taurus and Gemini. The eagle of Varuṇa, his golden-winged messenger, seems to be the constellation figure of Aquila.

Yama and Yamī are traceable to the Indo-Iranian period as Yima and Yimeh. The name of Yima is found in the Avesta where we come to know something about him. Yimeh is not mentioned there and seems to appear at a later period. Comparing the attributes of Yama as the god of the dead in the Vedas with those of Yima of the Avesta we are inclined to believe that they are separate deities or, at least that the conception regarding their physical nature was different, in spite of the fact that both are regarded as the sons of the sun. It is highly probable that Yima is different from Yama, and Yima and Yimeh came down to the Vedic period as Yama and Yamī. The myth that Yima and Yimeh were the first living couple was probably consistent with the prevalent custom of the Indo-Iranian people of marriage between the brother and sister; as the custom changed in later times, the Vedic sages considered such pairing objectionable and hence the refusal of Yama to Yami's proposal. It is also highly probable that Yama as the god of the dead was a conception which originated in later Vedic times. The real physical basis of Yama and Yami has been sought by Max Müller in the day and night. In Śatapatha Brahmana the earth is called Yamī. Hence they may mean heaven and earth.

6. *Rudra and Rudras.* The names of Rudra and Rudras occur some hundred times in the Rigveda, excluding those passages where the Maruts have been addressed as Rudra's sons. The terms, however, have been used in three senses: First, the term in the singular has been made to qualify certain deities. Secondly, we have a deity by the same name. Thirdly, the term in the plural indicates a group of deities under the name of Rudras. The term has been used to qualify Agni (I. 27. 10; II. 1. 6; V. 3. 3; etc.), Asvins (I. 158. 1; II. 1. 6; VIII. 26; 5; etc.), Soma (IX. 73. 7) and Mitravaruṇa (V. 70. 2), probably signifying redness, lustre or fearfulness. Further we have mention of a red cloud (VIII. 63. 12). Asvins have also been addressed as *rudravartman* (I. 3. 3; VIII. 22. 1, 14) having a bright path (referring perhaps to the morning light).

Rudra, as a deity, has been invoked with others in several places (V. 41. 2; V. 51. 13; VI. 62. 8; X. 93. 4; etc.). He has also been addressed as the father of Maruts (I. 33. 1), Tryambaka (VII. 69. 12), Varāha (I. 11. 4, 5), and Vṛṣabha (II. 33. 4, 7, 8, 13). Rudra possesses numerous characteristics. He lives in the heaven (I. 114. 5; II. 33. 15). He is brilliant (I. 114. 4, 5; V. 42. 11; etc.), glittering like gold (I. 43. 5), and bright like the sun (I. 43. 2). He is of a whitish colour (II. 33. 8) and is also reddish-brown (II. 33. 5, 8, 9; etc.). He is multiform (II. 33. 9, 10). He is bent to one side (I. 114. 4). He is youthful (II. 33. 11) and strongly built (II. 33. 9); there is none stronger than Rudra (II. 33. 10); he is strong-armed (II. 33. 3) and is called *asura* (I. 122. 1; V. 42. 11) evidently referring to his unusual strength; he is called the boldest of the bold (II. 33. 3). He has a well-formed nose (II. 33. 5) and has braided hair (I. 114. 1, 5). He has got brilliant gold on his body (II.

33. 9) and has a necklace (II. 33. 10). He holds a strong bow in his hand (II. 33. 10, 14; VII. 43. 1) and is a sharp archer (VII. 46. 1). He remains seated on the chariot (II. 33. 11). He has an army (II. 33. 11). He is the lord of the world (II. 33. 9; VI. 49. 10). He is the best of the physicians (II. 33. 4) and has 1,000 medicines (VII. 46. 3); he holds healing drugs (II. 33. 7); he has been prayed to for the cure of diseases (I. 43. 4), particularly cholera (*visucī*) (II. 33. 2) and for a life extending over a hundred winters (II. 33. 2). Rudra is said to pour down rain from the firmament with the help of the Maruts (X. 92. 9). We are also informed of his disposition. He is hot-tempered (II. 33. 9, 11; X. 126. 5), dreadful like a beast (II. 33. 11), and destructive in nature (II. 33. 11). His harmful disposition is clearly shown in the way he is invoked (VII. 46. 4) to do no harm to the children and elderly sons (VII. 46. 3), not to make one ill (VII. 46. 2), not to be offended with the people (II. 33. 4, 5; VII. 46. 4; etc.), to hold back his weapon and evil will from the people (II. 33. 14), and to slacken the chord of the bow (II. 33. 14). He is also invoked not to deprive one of the sight of the sun (II. 33. 1) and to protect one from Rudra's thunder which travels from the firmament to the earth (V. 51. 13).

Two other deities, Keśin and Vāgdevī, are found connected with Rudra. The first one is brilliant and provides all the worlds with light (I. 136. 1); he holds the fire, water, heaven, and earth; he visits the wandering places of the apsaras, gandharvas, and deer (I. 136. 6). When Keśin drank water in the (same) pot with Rudra, Vāyu agitated it (water) and broke down the inflexible (X. 136. 7). Vāgdevī is said to help Rudra in stretching his bow when the latter makes ready to kill the enemy; she fights for the people (X. 125. 6). She travels with the Rudras and Vasus (X. 125. 1).

Lastly, we have a group of deities collectively called Rudras. They have been mentioned several times with Indra (II. 32. 2, 3), Agni (I. 58. 3; VIII. 103. 14; X. 32. 5), and with Rudra himself as the chief of the Rudras (X. 64. 8) and invoked to be propitious to the Rudras (VII. 35. 6). They are often associated with the Vasus (I. 45. 1; II. 31. 1; X. 66. 4, 12; etc.). Aditi is their mother (VIII. 101. 15).

Rudra is invoked or otherwise mentioned some fifty times in Vājasaneyi Samhitā. Most of the attributes of Rudra that we find here are undoubtedly derived from the Rigveda. He has also been addressed as Tryambaka (3. 58, 60) and Pāsupati (lord of beasts) (6. 32; 9. 39; etc). Ambikā is his sister (3. 57). Rudra used to be invoked at dawn (34. 34; 38. 16). His neck is azure and the body is red (16. 7); he is hundred-eyed (16. 12) or thousand-eyed (16. 8; 16. 29); he is golden-armed. He is clothed in a garment made of skin (3. 61). He is hundred-bowed (16. 29) and again holds a shaft in his hand (16. 1). He is a mountain-dweller (16. 2, 3, 4). He is a divine physician (16. 5) and is the lord of plants (16. 19) ; his is the healing medicine (3. 59). He is the leader of hosts and lord of regions (16. 17). He is a husband-finder (3. 60). Herdsmen and girls carrying water have looked at him (16. 7). In addition, we have Īśāna (39. 8), Nīlagrība (16. 28), Pasūpati (16. 28 ; 39. 8), Mahādeva (39. 8), Śarva (16. 28 ; 39. 8), and Sitikaṇṭha (16. 28). Homage is given to them individually. Lastly, we have Rudras, Bhavas, and Śarvas. Rudras have traits similar to those of Rudra (16. 58–66). They are said to maintain their stations in the regions and surround Rudra (16. 6). They are lords of assemblies and masters of horses (16. 24), lords of troops and sharpshooters (16. 25) and overlords of the southern region (15. 11). Their throats are white and necks are blue (16. 56). They remain in the sky (16. 56) and again are innumerable on the surface of the earth (16. 54). They are bright (15. 11). They are connected with summer (21. 24) and with rain (33. 50). Bhavas (16. 55) live in the air and Śarvas (16. 57) live beneath the earth.

Rudra is mentioned several times in Taittirīya Saṃhitā. He has a dart (1. 1. 1). He guides in the path of Mitra (1. 2. 4). We have mention of Paśupati (1. 4. 36 ; 4. 5. 5), Bhava (1. 4. 36 ; 4. 5. 5), and Śarva (1. 4. 36 ; 4. 5. 5). Rudras are also invoked with Vasus and Ādityas (1. 11, 13). They remain on the earth (4. 5. 11). Bhavas live in the air (4. 5. 11). Śarvas with black neck and white throat, wander below the earth (4. 5. 11).

Coming to the Atharvaveda, we find that many traits of Rudra and others as depicted in the Rigveda are repeated here. Rudra has been invoked many times alone, with the Rudras (19. 10. 6), with Paśupati, Bhava, and Śarva (12. 8. 9). He is thousand-eyed (11. 2. 3), blue-locked (11. 2. 7) and immortal (11. 2. 3). We are informed of his dark crests (2. 27. 6), his breath, noise, and pangs (11. 2. 3). He has got healing remedies (2. 27. 6) and the disease is his name (6. 44. 3). Takman (fever) and Kāsika (cough) are his weapons (11. 2. 22). He has a golden-yellow bow (11. 2. 12). He has a one-shafted and hundred-tipped arrow (6. 57. 1). He has a club (11. 2. 19). He has been called hundred-weaponed (11. 2. 12). He is considered to be the lord of cows, horses, sheep, goats, and men (11. 2. 9). He has dogs (11. 2. 30). Rudra has been invoked as Bhava and Śarva (11. 2). Rudra is said to remain in the fire, within the waters, in the herbs and trees, and is said to have shaped all living beings (7. 92. 1). Yakṣa within the waters belongs to Rudra and the waters of the heaven increase their flow for him (11. 2. 24). Rudra marks the fall of Keśin's chariot (12. 2. 18). Īśāna, Ugradeva, Paśupati, Bhava, Mahādeva, and Śarva are not only invoked, but have been given a more prominent place than in the other Vedas. All of them are archers. Assigning a fixed quarter to Rudra (15. 5. 10), Ugra is regarded as the lord of the northern quarter (15. 5. 8), Paśupati of the western quarter (15. 5. 6, 7), Bhava of the eastern quarter (15. 5. 1), Mahādeva of the southern quarter (15. 5. 7), and Śarva of the upward quarter (15. 5. 7). Īśāna is regarded as the lord of all the quarters (15. 5. 15). Paśupati is regarded as the lord of bipeds and quadrupeds (2. 24. 1 ; 12. 8. 9), but the term seems also to be used for qualifying Bhava (11. 2, 28) and Rudra (11. 2. 5). Bhava has been invoked with Rudra (3. 16. 1 ; 11. 2. 14), with Ugra and Śarva (15. 5. 9), and with Soma and Īśāna (15. 5. 3). Bhava has been invoked with Śarva to prevent epidemics (11. 2. 2). Mahādeva has been invoked with all the other deities except Rudra (5. 21. 11). Śarva has been called spotted-armed (8. 8. 17). Rudras have also been invoked in the present work. They have once been addressed with Rudra (19. 10. 6). They are sky-reaching (5. 3. 10), of keen brightness (19. 9. 10). They are twice associated with Vasus (8. 8. 12 ; 10. 7. 22) and four times with the Vasus and Ādityas (10. 7. 22 ; 12. 2. 6 ; 19. 9. 11 ; 19. 11. 4).

Turning to the Brahmanic literature, Agni (fire) is said to have nine forms: Aśani, Īśāna, Ugra, Kumāra, Paśupati, Bhava, Mahādeva, Rudra, and Śarva (Śat. Br. 6. 1. 3. 18). Aśani is regarded as lightening (Śat. Br. 6. 1. 3. 14). Īśāna is considered as an Āditya (Śat. Br. 6. 1. 3. 17). He dwells in the south (Jaim. Uttar. 3. 21. 2). He divides into ten, he is the rays of the sun which, becoming life, reside in all living beings (Jaim. Utt. 1. 29. 3, 4). The herbs and trees belong to Ugra (Kaus. 6. 5). Kumāra, according to Amarakoṣa is Rudra's or Agni's son. He was born in the *sambatsara* (Śat. Br. 6. 1. 3. 8–10). *Sambatsara* is Kumāra (Śat. Br. 11. 1. 6. 5 ; 11. 1. 6. 3). The herbs belong to Paśupati, from whom the animals get their medicine (Śat. Br. 6. 1. 3. 12). Vāyu is from Paśupati (Kaus. 6, 4). Bhava is external (Śat. Br. 1. 7. 3. 8). The cloud is Bhava, all those exist from the cloud (Śat. Br. 6. 1. 3. 15). Water arises from Bhava (Kaus. 6. 2). Agni is Rudra (Śat. Br. 5. 3. 1. 10 ; Tāṇḍya Br. 12. 4. 24 ; etc.). The Moon is Rudra (Kauṣ. 6, 7). He is fulfiller of desire (Kauṣ. 3. 4. 6 ; Śat. Br. 13. 3. 4 ; etc.), lord of beasts (Śat. Br. 1. 7. 3. 8 ; etc.), awful (Kauṣ. 16. 7), and is provided with a dart (Sūla) (Ṣaḍb. Br. 5. 11). We have mention of his arm (the nakṣatra Ārdrā, according to Śayana) (Taitt. Br. 1. 5. 1. 1). Rudra arose from a weeping (raining ?) one (Śat. Br. 6. 1. 3. 10), Mṛgavyadha (the star Sirius) is Rudra (Aitar. Br. 3. 33). Rudra is the lord of the northern (upper) region (Śat. Br. 2. 6. 2. 7 ; etc.). Rudra is said to have killed the cow (Tāṇḍya Br. 6. 9. 7) ; again the cow is called raudrī (Taitt. Br. 2. 2. 5. 2). Ambikā is Rudra's sister (Śat. Br. 2. 6. 2. 9 ; Maitr. Sam. 1. 10. 20) ; she is 'autumn' (Taitt. Br. 1. 6. 10). Again 'autumn is called the place of (origin of) Rudra (Maitr. Sam. 1. 10. 20). Ambī is the wife of Bhava, Tryambakas are from her (Mait. Sam. 1. 10. 20). Śarva remains in the south (Śat. Br. 1. 7. 3. 8). Lastly, we have the Rudra. They are from the southern direction (Ait. Br. 8. 14). They are invoked by the summer (Tait. Br. 2. 6. 19. 1). They are inaugurated in the midday, while the Vasus are celebrated in the morning and Ādityas in the third part of the day (Śat. Br. 14. 1. 1. 15; Taitt. Br. 1. 5. 11. 3). Their number is fifteen (Taitt. Br. 2. 6. 19. 1) or eleven (Taitt. Br. 1. 5. 11. 3). The eleven Rudras are thus enumerated in Mahābhārata (I. 66. 2-3); Mṛgavyādha, Sarpa, Nirṛti, Aja Ekapāt, Ahirbudhnya, Pinākin, Īśvara, Kapālī, Sthānu, Bhaga, and Rudra.

In the old astronomical works we find that most of deities in question are the presiding gods of the various asterisms. Rudra is the lord of Ārdrā (Yājuṣajyotiṣa sl. 10, 32; Ārcajyotiṣa sl. 9, 25; Somasiddhānta 4, 6, 9). Mṛgavyādha is the star Sirius, Sarpa is the asterism Asleshā or its presiding deity (Y. sl. 10, 32; A. sl. 9, 25; Pitāmaha-siddhānta; Vṛddhavasiṣṭha-siddhānta 8, 20). Nirṛti is the lord of Mūlā (Y. sl. 33; A. sl. 26), Aja Ekapāt is the lord of Purvabhādrapada (Y. sl. 10, 34; A. sl. 9, 27). Ahirbudhnya is the lord of Uttarabhādrapada (Y. sl. 18, 34; A. sl. 14, 27; etc.). Bhaga is the lord of Purvaphalgunī (Y. sl. 18, 32; A. 14, 25; etc.).

In Nighaṇṭu (5. 4, 3), the term Rudra is made to signify 'one who cries, makes a noise or gives rise to a downpour (of rain); one who makes (the enemies) cry. A passage (quoted from Hāridrava, a recension of Maitrāyaṇī Saṃhitā) means that Rudra repented and shed tears after having pierced the father Prajapati with an arrow. If the term is made to derive from the root *rud* to be ruddy, it may mean the 'red one' (Pischel) (cf. the ancient Iranian word *raoidita*, reddish).

According to oriental scholars, Rudra is a storm-god or tempest-god. His mischievous side is attributed to the destructive agency of light. From his name he is connected with thunder (one who makes noise). The suggestion (Macdonell's *Vedic Mythology*, p. 77) that 'his beneficent and healing powers would be based partly on the fertilising and purifying action of the thunderstorm and partly on the indirect action of sparing those whom he might slay' does not appeal to me.

Some of the traits of Rudra, namely, his pouring down of rain from the firmament with the help of the Maruts and his connection with the thunder, no doubt connect him with storms and rains which characterise the summer monsoon, generally starting sometime after the summer solstice. The attribute of Rudra as a physician with his healing herbs (used as drugs) and the obeisance to him for the prevention or cure of diseases, particularly of children and young men, bring him into close connection with the autumn (after the rains have started and have continued for sometime). This is further confirmed in Maitrāyanī Saṃhitā, where Rudra is said to have his birth in the autumn. Last of all, the characteristic peculiar to him and a few others (who are with one exception, nothing but his counterparts) is that he is an archer. This, with the note that Rudra lives in the heaven, leads us to the idea that Rudra is nothing but the sign Sagittarius which used to appear in the Heaven at dawn in the autumn when the observations were made. Plunket in his *Ancient Calendars and Constellations* (pp. 151–161) advanced this view. He also proved that the traits and deeds of Greek god Kiran are exactly similar to those of Rudra and in his myth we are told that he had his place in the sign Sagittarius after his death. He was thus made the presiding god of all the physical phenomena of the time. We can easily explain the various attributes of Rudra if we accept this view. His brightness and golden ornaments are attributable to the bright stars in the constellation and the milky way passing through its upper part. His strength and youthfulness have been taken from the distressing effect of the thunderstorm, which was taken to be one of his deeds. The peculiar configuration of the constellation, half-man and half-goat perhaps led to his attribute as 'multiform'. His hot-temper, dreadfulness and destructiveness are all accountable to the storms which are due to him. Rudra's hundred or thousand eyes and his hundred bows are the parabolic expressions of his bodily features and weapon. We do not know whether the herdsmen and girls carrying water actually refer to mortal beings frightened from the advent of storms, or to Cepheus (the constellation figure of which represents a herdsman with his flock of sheep) and Aquarius (representing a *man* holding a bucket on his shoulder) which used to appear in the sky with Sagittarius. His attribute as a husband-finder led to the practice of giving by young girls of offerings to Siva for a good husband. The origin of the idea is perhaps to be sought in the activity of strong hardy persons in rescuing people during the distressing storms and drawing the attention of girls to seek husbands amongst them. The great distress and mortality amongst goats, sheep, cattle, and even men, thought to be caused by Rudra and to be preventible by paying homage to him, perhaps led to the idea of his lordship over animals. The name Tryambaka meaning three-eyed is explained by Plunket in a very ingenious way: he holds that the third crescentic eye is nothing but the half moon which used to rise in the sign Sagittarius at about 4000 B.C. when the autumnal equinox was in this sign.

We have already seen that, while Rudra alone is found to be invoked in the Rigveda, a number of other deities are closely associated in the other vedas. Their number has increased gradually from the Yajurvedas to the Atharvaveda where they hold a prominent place equally to Rudra. They are all archers and different directions are assigned to them round a fixed quarter of Rudra. They have been addressed in various combinations and many times with Rudra himself. In the Brahmanas they are regarded as forms of Agni. As we know, they are now considered as the names of the god Siva. We may reasonably assign their origin to the division of the original large constellation Rudra into so many forms each bestowed with certain attributes. Their actual nature seems to have been forgotten in the Brahmanic period. We have sufficient evidence of the division of larger constellations into smaller ones in past times : I may just mention one, named Ophiuchus, placed just above Sagittarius. It has the figure of a male holding a snake in both hands. He was regarded as a great physician in Greek Mythology. The Arabs used to represent him as a shepherd and he was assigned a mischievous disposition (Whyte's *Constellations and their History*, p. 199 and Smyth and Chamber's *Cycle of Celestial Objects*, p. 495). Evidently, this was derived from an originally larger sign Sagittarius and was made a new one.

Lastly, the Rudras were recognised as early as Rudra, who was considered their chief. Taking the significance of their name as ' bright one ' or ' red one ' and considering their general traits, we may take them to be neighbouring asterisms not yet definitely recognised by distinct names. This is distinctly shown by the names of eleven Rudras, as enumerated in the later Sanskrit literature, where they are all connected with the asterisms.

In this connection we may also consider the nature of Keśin and Vāgdevī. The characteristics of Keśin lead us to follow Sāyaṇa and consider him the sun. His drinking of water with Rudra from the same pot refers to his arrival in the sign Sagittarius. The fall of his chariot indicates the southward passage of the sun after the autumnal equinox. Vāgdevī seems to be the goddess who was held responsible for the sounds in the storm apart from the thunder.

7. *Vasus.* The term Vasus occurs more than fifty times in the Rigveda. It seems to signify food (*anna*) in one passage (VII. 1, 2) and money, fortune or prosperity in several others. In several places the word has been used to qualify various deities, as Agni, Indra, Ṛbhus, Maruts, Mitra, Varuṇa, and Viśvadevas, evidently indicating them as ' givers of prosperity '. Lastly, in some thirty-six passages the term is meant for the deities under consideration.

Vasus as deities have been invoked alone and with others ; on several occasions they have been addressed in conjunction with Rudras and with Rudras and Ādityas.

Vasus are themselves called Ādityas (II. 27. 11 ; VIII. 18. 15 ; VIII. 18. 17). They are brilliant (V. 41. 18). They have a heat-giving wheel (*cakra*) (II. 34. 9) and a beautiful and pleasant boat (VIII. 18. 17). They have a cloud-splitting and mankilling weapon (VII. 56. 17). We know of their cow from which food has been begged (V. 41. 18).

We are also informed of some actions of Vasus. They have established strength in fire (VII. 5, 6) and served the work of fire (VII. 5, 6; VII. 11. 4). They have served the Maruts (VII. 39. 3). They are said to have released the *gouri* cow (IV. 12. 6). Lastly, in a passage of the Horse-hymn (I. 163. 2) we are told that Trita yoked the horse given by Yama, Indra rode on it first, Gandharva (the moon according to Sāyaṇa) held its reins, and Vasus fashioned it from the sun.

Coming to White Yajurveda we find them invoked on some twenty-one occasions. Here they are somewhat closely related to Indra: Indra is their lord (38. 8); he is their companion (28. 4) and is anointed by Vasus and Rudras (23. 8). They have been invoked with Rudra, Rudras, and with Rudras and Ādityas. They are praised with the spring (21. 23).

They have also been invoked in Black Yajurveda usually with Rudras and Ādityas.

In Atharvaveda, Vasus, as deities, are mentioned in some twenty-four passages. They have been invoked alone, and with Ādityas, Ādityas and Rudras, Ādityas and Indrāgni and Bṛhaspati. Ādityas, Rudras, and Vasus have been considered to be gods in the heaven (11. 8. 13). Vasus maintain good things (1. 9. 1). They are the masters of the removal of distress (4. 27. 6). They are said to guard the cow on the right, Maruts on the left and Ādityas behind (10. 9. 8). There are three obscure passages which run thus: (1) The cow is heaven, the cow is earth, the cow is Viṣṇu and Prajāpati; Sādhyas (Gods of fulfilment) and Vasus drank her milk (10. 10. 30). (2) Having drunk the yield of the cow, Sādhyas and Vasus worship her milk (*paya*) at the top of the *bradhna* (sun) (10. 10. 31). (3) The worshipable (deserving of oblation) Puruṣa was born first and was sprinkled by the rainy season; by him the gods Sādhyas and Vasus performed the sacrifice (19. 6. 11).

Turning to the Brāhmanas, we find them mentioned in several works. They are eight in number: Fire, Earth, Vāyu, Firmament, Āditya, Heaven, Moon, and Asterism (Śat. Br. 11. 6. 3, 6). In the same passage the word is made to signify 'those who cause to live (exist)'. We are also told that the Viṣṇu-sacrifice has been divided into three parts, morning libation for Vasus, midday libation for Rudras, and third (afternoon) libation for Ādityas (Śat. Br. 14. 1. 1. 15). The eight deities, Vasus, are auspicious and the four goddesses, not subject to old age, are Śraviṣṭās (Taitt. Br. 1. 5. 1. 5).

Lastly, we find that the Vasus are the asterism Dhaniṣṭha (Ārc. jyot. sl. 9; Yāj. jyot. sl. 10) or its presiding deities (Ārc. jyot. sl. 29; Yāj. jyot. sl. 34).

The eight Vasus, already enumerated, are differently mentioned in the later Sanskrit works. Thus, (i) according to Mahābhārata (Dānaparva), they are Dhara, Dhruva, Soma, Sāvitra, Anila, Anala, Pratyuṣa, and Prabhāsa; (ii) according to Bhāgavatapurāṇa, they are Droṇa, Prāṇa, Dhruva, Arka, Agni, Doṣa, Vāstu, and Vibhāvasu; (iii) according to Vāyu- and Kūrmapurāṇa, they are Āpa, Dhruva, Soma, Dhara, Anila, Anala, Pratyuṣa, and Prabhāsa; lastly (iv), according to Amarakoṣa, they are Dhara, Dhruva, Soma, Viṣṇu, Anila, Anala, Pratyuṣa, and Prabhāsa. In these different enumerations, we may regard Anala identical with Agni, Arka with Viṣṇu and Sāvitra, Drona (literally meaning a cup) with Soma (the moon), Dhara with Vāstu, Pravāsa (a shining one) with Vibhāvasu and Prāṇa with Āpa. Doṣa (evening) probably corresponds to Pratyuṣa (dawn) referring to the comparative darkness after sunset and before sunrise. Thus we have Agni (Anala), Arka (Sāvitra, Viṣṇu), Āpa (Anila, Prāṇa), Doṣa and Pratyuṣa, Dhara (Vāstu), Dhruva, Pravāsa (Vibhāvasu), and Soma (Droṇa) as the Vasus.

I shall now consider what led to the idea of Vasus as deities. The significance of the term *vasu* as used in the Rigveda may reasonably make one think that the vasus were regarded as givers of food, fortune, and prosperity. We also have direct evidence in the same work and in the Atharvaveda. Vasus' cows are begged for food. They are themselves said to maintain good things and are regarded as the masters of the removal of distress. The Vasus are connected with the hot season and rains. They have a heat-giving wheel which we take to mean the sun. They served the work of fire. Their cloud-splitting and mankilling weapon is no doubt the thunder during the storm and rain. Indra's lordship and companionship of the Vasus point to the same thing. We know that the summer and rains are closely connected in northern India. The relationship of the Vasus, as the deities of fortune and prosperity, with the summer and rains can be thus accounted for: Barley and perhaps wheat(?), at least at a later period, which seem to have been the principal cereals of the people during the Vedic times, are the winter crops of the North-West India. The harvest at the end of the winter led to the storing up of the crop in large quantities. A large crop of the principal foodstuff really formed the fortune of the people during the rains, as it would give them relief at this distressing part of the year. It is for this reason that the Vasus were connected with this season.

Now what caused the Vasus to be connected with Dhaniṣṭha? In Taittirīya Saṃhitā we find the eight vasus mentioned with four goddesses, called Śraviṣṭās, evidently connecting them with one another. As already noted, Vasus have been regarded as the asterism Dhaniṣṭhā or its presiding deities. Again the constellation Delphinus which is more or less coincident with

Dhaniṣṭhā formed the sky figure of benevolence in the ancient astronomy of the western people (Whyte's *Constellations and their History*, p. 179). This relation between the Vasus and Dhaniṣṭhā can only be reconciled if we suppose that, at the time when the hymns were composed from actual observations, Dhaniṣṭhā used to rise in the early part of night during the summer and rains. In such a case the vernal equinox must have been passing through the beginning of Krittikā and end of Bharaṇī. Some of the characteristics of the Vasus, as being Ādityas, their brilliancy and their close connection with Sraviṣṭās are suggestive of a representation of a group of stars (constellation) as their physical basis; but nothing can be definitely stated for want of further evidence.

I shall now try to interpret some passages. The boat of the Vasus may be some constellation figure in Delphinus. In Hindu Astronomy Dhaniṣṭhā is represented by a drum-like musical instrument called mṛdanga or mardala. In western astronomy we have a dolphin as the constellation figure of Delphinus. However, we find in Dolphin 'a natural symbol "at a place where ships can anchor" (Brown's *Primitive Constellations*, Vol. I, p. 185). Hence it is not improbable that the boat might have been a figure in this constellation. Their cow might be the clouds. Their connection with fire may refer to summer heat. The *gouri*-cow may be the red cloud. The horse fashioned by the Vasus from the sun seems to be the sun's rays. Their connection with Rudra, Rudras, and Ādityas simply refers to the neighbouring bodies, such as the sign Sagittarius and other collections of stars (considered as Rudras and Ādityas).

The three passages from the Atharvaveda, above referred to, may thus doubtfully be explained: The first passage may refer to the production of a good crop due to the agency of heaven (pouring down rains), earth (on the soil of which the crops grow), Viṣṇu (the giver of heat and light on which depends the growth of crops), and Prajāpati (as the supreme being who makes a good provision by the profuse growth of crops); they are thus all spoken of as 'cows' which are bestowers of milk as food as they are of crops as provision. The top of the *bradhna* (which we take for the sun) probably refers to the position of the asterism Dhaniṣṭhā, which is placed at a distance above the ecliptic, the path of the sun. In the third passage Puruṣa (representing Brahman as the Sambatsar—the year) refers to the year, and his birth to the beginning of the year during the rainy season which was connected, as we have seen, with the Vasus.

Lastly, as regards the individual names of the Vasus in the later Sanskrit literature, we may take them as agencies which were considered to be the bestowers of prosperity upon the people. That some of them at least refer to heavenly bodies is shown by the names of the sun, moon, and probably Āpa (Pūrvāṣāḍhā) and Dhruva (the polar star ?). The origin of the idea is perhaps to be traced to the passages in the Rigveda where several deities are qualified as Vasus.

D. Deities connected with entrazodiac constellations.

1. *Pūṣan.* The Rigvedic Deity Pūṣan has been invoked alone *in eight hymns* (I. 42 ; VI. 53–56 ; 58 ; X. 26), with Indra in one (VI. 57) and with Soma in another (II. 40). He is also celebrated along with several other deities in general in some fifty-eight hymns or more. He has also been praised in the Atharvaveda.

In Rigveda we find the mention of a few anthropomorphic characters of Pūṣan. Thus he has braided hair (VI. 55. 2 ; IX. 67. 11), and has a beard (X. 26. 7). We have mention of *his right hand by means of which he holds a goad* (VI. 54. 10). He is besought to trample on the brand of the wicked by his foot (I. 42. 4). He is a visible deity (VI. 56. 4). We see many physical attributes which point to his bodily strength. Thus he is an *asura* (V. 51. 11), strong and swift (V. 43. 9), vigorous (VIII. 4. 15), powerful (I. 1318.) and resistless (VI. 48. 15). He is described as of irritable temper (*ugra*) (VI. 53. 4). He is bright (I. 23. 14 ; VI. 48. 16 ; etc.) and called *agohya* ; that is, not to be concealed. His food is gruel (VI. 56. 1). He wears cloth woven of wool (X. 26. 6).

We find his weapons mentioned in several hymns. Thus he holds a golden spear (vāśi) (I. 42. 6). He holds a goad (or bridle) in his hand (VI. 53. 1 ; VI. 58. 2).

He is the *best charioteer* (V. 56. 2, 3). The wheel of his car is indestructible ; the nave of the wheel never wears off and the felly never becomes out of order (VI. 54. 3). He is constantly moving his golden wheel (VI. 56. 3).

Pūṣan is *closely connected with the goat*. He has been called *āja*, that is, provided with a goat (I. 23. 13) and *ājāsva* (having a goat instead of a horse) in many places (I 138. 4 ; VI. 55. 3, 4 ; IX. 67. 10 ; etc.), evidently with reference to his chariot being drawn by goats which is distinctly mentioned in a few places (VI. 55 ; IX. 26. 8) ; again goats are called his carriers (VI. 57. 3). He is *the lord of glowing he- and she-goats* (X. 26. 6). The goat is dedicated to him in the horse-sacrifice (I. 162. 2–4).

In several places we are informed of the abode of Pūṣan. He is placed above the mortal world and is equal to other deities in beauty and prosperity (VI. 48. 19). He *appears in the heaven at night towards the morning* (VII. 39. 2) *and goes away at sunrise* (X. 1391.). He knows all the directions (X. 17. 5). His golden boats float on the heavenly ocean and *he acts as a messenger of the sun* (VI. 58. 3).

Pūṣan has been called the lover of his sister (the morning) (VI. 55. 4, 5), the *lord of night* (VI. 55. 5) and, again, the *husband of the heaven and earth which remain together* (X. 17. 6).

Pūṣan has been endowed with several functions. First, he is regarded as the lord or guardian of roads (VI. 49. 8; VI. 53. 1). He is implored to remove all sorts of danger from the path (I. 42. 1–3), to protect one in his path (VI. 54. 9), to allow an auspicious path (X. 59. 7) and so forth. Secondly, he is connected with rains and storms. He is invoked for rain (X. 98. 1). He is said to be the bestower of rain (X. 26. 3), to help Indra in the pouring down of rain (VI. 57. 4), and to milk the heaven with Indra and Mitravaruṇa (III. 57. 2). He has been mentioned as a friend of Indra in one place (VI. 56. 2) and as a brother in another hymn (VI. 55. 5). He has been prayed not to uproot the trees, thus indicating his relation to storms (VI. 48. 17). It is perhaps in connection with his rain-giving function that Pūṣan has been called 'deliverer' (VIII. 4. 15, 16) and son of deliverance (VI. 55. 1). Thirdly, he is called the protector of cattle (VI. 54. 5, 6, 10; VI. 58. 2; etc.) and perhaps of beasts in general (VI. 53. 9). Fourthly, we have distinct reference to his connection with cultivation. He is invoked to preside over the furrow produced by tilling the ground in a hymn dealing with cultivation (IV. 57). We can easily realize the importance of his second and third functions in relation with the fourth. Fifthly, he has been invoked for his gift of beautiful maidens (IX. 67. 10–12).

We also get the mention of Pūṣan as undertaking the ceremony of *varaṇa* in the marriage of the twin-gods Aświns with Sūryā (X. 85. 14). In another hymn (V. 184. 3) we are informed that he swiftly carries Sūryā with the help of the Aświns. Pūṣan brings the six seasons (?) repeatedly with Indu (I. 23. 15).

I shall now try to identify Pūṣan and find out his physical basis.

Following Yāska, who calls him an *Āditya* (Nirukta VII. 9), all Oriental Scholars (as Goldstücker, Roth, and Bothlingk, Wilson, Langlois, Max Müller, Macdonell, etc.) identify Pūṣan with the sun. Max Müller regards him as the sun as viewed by shepherds. Macdonell finds in him the sun manifested chiefly as a pastoral deity.

Although this idea has come down from Yāska and is universally accepted by Orientalists, I do not agree with them and hold a different view altogether.

There is great difficulty in regarding Pūṣan as the solar-deity from the fact that he is called a messenger of the sun and he appears in the heaven at night. Hence he cannot be our sun and must be something else.

We find that Pūṣan, among his various attributes, has been bestowed with several features which are peculiar to him. Thus he is called the best charioteer: he holds a goad or bridle in his hand; he is variously connected with glowing goats; and he is himself bright. These characters are quite sufficient to lead us to the view that Pūṣan is nothing but the constellation named Auriga of the Northern Hemisphere.

The constellation Auriga is also known from ancient times as a charioteer or Wagoner. The plan of the constellation, as it has been handed down to us, is now drawn in two ways :—(1) It is represented as a charioteer kneeling in his vehicle and often with a kid on his left shoulder (*Century Dictionary*), or (2) it is shown 'as an old man in a more or less sitting posture with a goat and her kids in his left hand and a bridle in his right' (*Encyclopædia Britannica*, 14th edition, article 'Auriga'; figure in the article 'Constellation'). We find a whip in place of a bridle in Johnston's celestial globe. Again coming to the derivation of the term 'Auriga' we see that it has been derived from *aurea*, bridle (*Century Dictionary*). Further the principal star α Aurigae or Capella of the constellation has from ancient times been regarded as the storm-goat. 'The two stars ζ and η in the arm of Auriga were regarded by mariners of yore as affording presages of the weather; and they were so much dreaded, that they are said to have closed navigation at their rising. Hence, in an Epigram of the *Anthologia*, Callimachus says:

Tempt not the winds, forewarned of dangers nigh,
When the kids glitter in the western sky.' (Smyth and Chamber's *Cycle of Celestial Objects*, p. 129).

We find a parallelism of Pūṣan in the Achaian Storm-god Akethorr (Thonthe—Charioteer) whose car is drawn by two storm-goats. (See *Primitive Constellations* by R. Brown, Vol. I, p. 219.)

The Arabs named him the 'Guardian of Pleiades' and the Pleiades were regarded as the seven daughters of Atlas in Greek Mythology. (*The Constellations and their History*, by Rev. C. Whyte, pp. 106, 155.) We thus see why he was invoked as the giver of maidens.

There is sufficient evidence to show that the constellation figures, charioteer and the goat, were recognized by the Babylonians and Chaldaeans. (See R. Brown.)

The heavenly ocean referred to above is undoubtedly the milky way in which the constellation is situated. The glowing boats are no doubt the bright stars shining in the milky way. Pūṣan's lordship of the paths perhaps indicates the determination of the direction at night from his position in the sky.

Lastly, we may attempt roughly to determine the time referred to by the hymns sung in praise of Pūṣan. We have seen that he is closely connected with rains and storms and we are told that he used to appear in the heaven at night towards morning with the Aswins (α and β Arietes) and to go away before sunrise. From these facts we may infer that the vernal equinox was at that time somewhere near the Pleiades, and that when the sun used to rise in the heaven after the summer solstice and towards the autumnal equinox in the rainy season the Auriga used to appear at night in the west with the Aswins and set just before the morning on the western horizon. This used to happen somewhat between 1200 to 1500 B.C.

2. *Prajāpati*. The name occurs some five times in the Rigveda. In one (X. 169. 4) the sage Prajāpati seems to have been meant. In another place the sun was qualified as *prajāpati* (that is, lord of living beings) (IV. 53. 2). In the remaining places he has been invoked as a distinct deity, either simply with others (IX. 5, 9) or for progeny (X. 85. 4) or for efficient semen for conception (X. 184. 1). Thus he has been considered as the bestower of good progeny only.

Coming to the White Yajurveda, we find him mentioned some twenty times. He has been offered oblations some ten times. Elsewhere he has been prayed for strong male impregnater and vigorous son, who may himself be a father (8. 10). He has also been invoked for guarding treasure (8. 17) and for coming on the surface of the earth (13. 17, 24). He has been stated to be one than whom there is none more mighty and is said to pervade all existing creatures (8. 36). He is also said to exist in uttered speech (8. 54) and to be the lord of the world (18. 43). Prajāpati has been designated as *ṣoḍaśi* (that is, consisting of sixteen parts) and is said to maintain three great lustres (the sun, the moon, and fire according to the commentators) (32. 5). We are also told that none was born before him and that he created the whole world (32. 5). Again, we are informed of the birth or origin of Prajāpati: he is born from the timely germ laid down by the strong, self-existent first one within the mighty (vast) flood (space) (23. 63). Lastly, he is said to move in the womb, remaining unseen he becomes born (manifests his existence) in various ways. The intelligent (people) discern his origin and in him alone stand all existing (living) creatures (31. 19). Here we find that Prajāpati occupies a very prominent place and the conception of the sphere of his action has been greatly extended as the creator and supporter of the living world.

We find nothing important concerning the deity in the Black Yajurveda.

We have plenty of information regarding this deity in the Atharvaveda. We find him closely connected with generative powers and gift of progeny (VI. 11. 2; VI. 20. 1; XIX. 17. 9; XIX. 18. 9; XIX. 19. 11). He is said to have created all, the highest, middle, and the lowest (XII. 1, 61); he is the lord of creation and protector of all creatures; with a half (of his power) he generated all existence (X. 8, 13); he maintains all the worlds (X. 7. 7); he fulfils what is deficient on the earth (XII. 1, 61). He has twice been called the first-born of righteousness (IV. 35. 1; XII. 1, 61). He is connected with thunder in several ways: His voice is thunder (IX. 1, 10, 20); he manifests himself to his creatures by thundering in a clear sky (IX. 1, 24). He is again connected with time: Time is the lord of all and was father of Prajāpati (XIX. 53. 8); time was Prajāpati in the beginning and generated progeny (XIX. 53. 10). He is said to have cooked the rice-mess for Brahman (IV. 35. 1); hence he was regarded as distinct and different from Brahman. Again in connection with the release of a house, we are told that the dwelling house was fixed and made by Prajāpati, who also made the forest trees give rise to young plants (IX. 3, 11). In a few hymns we find that Bringer and Gatherer are his two distributors (III. 24. 7), that *Sabhā* and *Samiti* are his two daughters (VII. 13. 1); *Ekāṣṭaka*, the mother of Indra and Soma, is the daughter of Prajāpati (III. 10, 13). Lastly, in a passage connected with shaving (VI. 65. 2) we find it stated that let Aditi shave the beard, let the waters wet (it) with splendour and let Prajāpati nurse it. Here we have a further step in generalisation of the functions of the deity.

We have voluminous references to the term Prajāpati in the Brahmanic literature. Practically all the objects then known or conceived of were called Prajāpati, perhaps from the idea that all their attributes (or their very existence) were due to him, as the creator or sustainer of all. Thus, the fire, sun, wind, moon, earth, and heaven have been disignated as Prajāpati; he has distinctly been said to represent 'all the gods'; he has again been identified with *Brahman* and *Ka*; he has been called the 'one' and 'all'; he is the *puruṣa* (supreme being) and is *citpati* (lord of the soul). Again, the year has been designated by the same name. He has again been made to represent the eagle (perhaps the constellation Aquila) and the rays of light (perhaps the stars or planets). He is said to reside in the voice, speech, mind, life, soul, and so forth. He is connected with religious ceremonies and ceremonial articles. Again, many sages, as Vasiṣṭha, Jamadagni, have been regarded as Prajāpati. We further find a large number of epithets assigned to him: He has been called *visvajit* (conquerer of all), *hiraṇyagarbha* (gold-wombed), *visvakarma* (creator of all), *anirukta* (unspeakable), *amṛta* (immortal), etc. Lastly, we find that Rohiṇī (the star Aldebaran) is the daughter of Prajāpati. The *Visva-devas* are his sons.

We have mention of Prajāpati in the old astronomical works of the Hindus. He is the lord of Rohiṇī (Aldebaran) (Ārcajyotiṣa sl. 25; Yājuṣajyotiṣa 32). There is a star of the same name (β Aurigae) mentioned in Soma-siddhānta (4, 6, 11), Brahma-siddhānta (2, 176), Vṛddhavasiṣṭha-siddhānta (8, 11), and Sūrya-siddhānta (8, 20); he is placed five degrees to the east of Brahmahṛdaya (Capella).

It is evident from what we have traced from the Rigvedic times down to the Brahmanic period that there has been a gradual change in, or rather a widening of the sphere of conception of the deity. Beginning with a limited idea as a bestower of good progeny, his sphere of power and benevolence has been modified and greatly widened, and he is ultimately considered as the supreme universal soul, the Brahman. (See Macdonell's *Vedic Mythology*, p. 119.) The bearing of Prajāpati to the celestial bodies as we find in the astronomical works will be discussed below.

There is a strange story about Prajāpati told in the Maitrāyanī Saṃhitā (4. 2, 12) which is also repeated in Aitareya Brāhmaṇa (3, 33), Śatapatha Brāhmaṇa (I. 7. 4. 1), and Tāṇḍya Brāhmaṇa (8. 2, 10). The story seems to have its origin in the Rigveda (1, 71. 5; X. 61. 5–7). The purport of the story runs thus: Prajāpati, becoming passionate of his daughter Ūṣas (dawn), followed her. She transformed herself into Rohiṇī (red cow or red deer) whereupon Prajāpati changed himself into a similar beast. 'Rudra (Mṛgavyadha) incensed at this aimed his arrow at him, whereupon Prajāpati promised to make him lord of beasts if he did not shoot'? Let us now see what we have actually in the Rigveda.

The first passage (1, 71. 5) from the Rigveda is rather obscure. Taking *Ka* to represent Prajāpati (as we find in X. 121. 10) and not '*karoti*' as done by Sāyaṇa, we translate it thus: when Ka, sticking to the great (vast) father Heaven, comes down, the archer throws the brilliant arrow at him by force. The Deva (that is, Ka) deposits his vigour in his daughter. The three remaining passages run thus: (Speaking of Visvadeva) He, whose works of splendour performed by impulse were renowned, dispelled for man; what the active one threw to his daughter, grows again (X. 61. 8). In the act done by the Father by passion with the young woman near the middle (region), they paired and discharged *retas* (germinal fluid) into the high (sacred ?) abode (*yoni*) of good-workers (performers of religious ceremonies) (X. 61. 6). When the Father paired with his daughter, he came in contact with the earth and discharged the semen. The good-working (that is, performer of religious ceremonies) Devas created Brahman, the Vāstuspati, the preserver of Vratas (religious vows) (X. 61. 7).

In interpreting the real significance of the story, we shall first consider these three passages. We find in the Rigveda that Prajāpati is connected with the granting of good progeny. Knowing that the greatest percentage of conception occurs in the spring, this season may rightly be taken to be the period of the benevolent act on the part of Prajāpati. The vernal equinox is connected with the beginning of the spring. As this point used to be calculated as the beginning or end of a year in the Vedic times and, as Prajāpati is connected with the time in the Atharvaveda and is identified with the year (*sambatsara*) in the Brāhmanas, we may find some reason why Prajāpati is considered as the bestower of good progeny. As already noted, *Ka* is Prajāpati and Father is the same deity. His daughter is Dawn (as interpreted in Maitrāyanī Saṃhitā and other later works). The archer is Mṛgavyadha (identified as one of the Rudras and with the brilliant star Sirius). Taking the physical basis of these, we may reasonably believe that Prajāpati, for his physical basis, must be some celestial object (constellation figure). We have some other evidences for the same. Thus, he is said to maintain three lustres, which the commentators hold as the sun, moon, and fire. As such an idea does not seem to be consistent, we take them as three brilliant stars. Again, we find in Śatapatha Brāhmaṇa (2. 1, 2, 8) that Mṛgasīras (the star λ Orionis) lies in the head of Prajāpati. As the same star lies on the head of the ancient constellation Orion, we may conclude that Prajāpati was more or less coincident with the same constellation.[1] The name of λ Orionis, signifying the head of a deer may make us think that the actual configuration, at least at a later period, was that of a deer (*ṛṣi*), as we find in the later modified version of the story. When the vernal equinoctial point was situated above or near Orion, the constellation used to appear in the dawn and close to the horizon at the beginning of the spring. We can thus explain the pairing of Prajāpati with his daughter and coming in contact with the earth. The discharge of the small quantity of germinal fluid is metaphorically the light showers of rain not uncommon at this time of the day. In the Atharvaveda Prajāpati is connected with thunder. In the later version of the myth, as told in Maitrāyanī Saṃhitā and Brāhmanas, Dawn is made to transform into Rohiṇī (the brilliant star Aldebaran). This can also be explained when we remember that the vernal equinoctial point moved back towards the beginning of the sign Taurus and came to be placed close to the star Aldebaran at a later period. As regards the archer, who is identified with the dog-star Sirius, placed in the constellation Canis major, we have no distinct evidence regarding its constellation figure, as the name implies. The star is placed in such a position that it is in the same line with the three brilliant stars of the belt of Orion. These three may represent the arrow thrown by the archer.

In the astronomical works, we have the name of a star, viz. Prajāpati which is identical with β Aurigae. This star is placed at a great distance from Orion on the northern side of the ecliptic. It is placed near another star called Brahmahṛdaya (Capella). In Ramāyana (6. 4, 48) we have mention of a *Brahmarāśi* as sacred. Perhaps, when the idea of the sages changed at a later period and Prajāpati was identified with Brahman, the constellation figure was also changed and made to embrace these stars. This is the only explanation that I can offer for the star β Aurigae being called Prajāpati and Capella as Brahmahṛdaya.

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[1] In Homer's Odyssey (XI. 310) Orion has been described as the Goodliest of men and he is said to be loved by Dawn.

Lastly, the origin of the name of the sign Mithuna may have something to do with the union of Prajāpati with Dawn.

The time of the origin of the myth may be roughly dated at about 4200 B.C. and the later modification at about 3500 B.C.

3. *Maruts.* The Maruts are invoked in thirty-three complete hymns and in most of the passages of two other hymns. They are invoked with Indra in one hymn, although they are associated with him in various ways. They are also addressed with Agni in three hymns and with Vāyu in three passages of a hymn. Lastly, they are praised or otherwise mentioned in more than 150 places alone or with other deities.

The Maruts are 3×7 (I. 133. 6), 7×7 (V. 52. 17) or 9×7 or 63 (VII. 96. 8). They are numerous, although they have the same name (VIII. 20. 13). They remain in a group (*gaṇaśriyaḥ*) (I. 64. 9 ; V. 60. 8), being associated together (I. 168. 4). They have the same form (I. 168. 9), are of the same age (I. 165. 1 ; V. 58. 5), none being eldest or youngest (V. 59. 6) and equally become pleasant (I. 186. 8) or enraged (II. 34. 5 ; VIII. 20. 2, etc.). They are called leaders in many passages (I. 39. 3 ; I. 64. 4 ; V. 54. 10 ; etc.).

The Maruts are visible (I. 64. 19) and are high in position (I. 64. 2 ; V. 52. 13 ; etc.). We have mention of their firm body (I. 64. 3), with head and fire-like tongue (I. 44. 14 ; I. 166. 11), shoulder (VII. 56. 13 ; etc.), strong arm (V. 57. 6 ; VIII. 20. 12), firm hand (I. 37. 3 ; I. 38. 11), and leg (V. 54. 11). The most characteristic bodily feature of the Maruts is their brilliancy, which is referred to in many passages by different epithets. They are brilliant (I. 19. 3, 5, 6 ; I. 37. 4 ; V. 52. 6 ; V. 57. 5 ; VII. 56. 16 ; etc.), self-brilliant (I. 37. 2 ; VI. 48. 12), brilliant like lightening (I. 172. 1), fire (VI. 662) and the sun (I. 64. 2). They are moon-like (V. 57. 8) and golden in colour (I. 165. 12). They are surrounded by rays of light (I. 19. 8 ; V. 52. 9). Again they are dark and ruddy (V. 57. 4), probably referring to the darkness due to cloud (or night) and brightness due to lightening (or day). They are spotted (I. 165. 13 ; II. 34. 11 ; VIII. 7, 7) like a deer (I. 64, 8). Their close connection with lightening will be referred to later when I consider their works. Of other physical features of the Maruts, we know of their fearful appearance (I. 19. 5 ; I. 64. 2 ; I. 169. 7 ; V. 56. 2), youthfulness (I. 64. 2 ; etc.), great strength (I. 19. 5 ;

I. 37. 7 ; I. 64. 9 ; I. 186. 8 ; V. 5, 6. 3 ; etc.), and their movements, which will be dealt with in connection with their works. Several personal traits of the Maruts are also known to us. They are pleasant (V. 54. 12), free from malice (I. 19. 3), and attractive to all (III. 26. 5) ; but at the same time they are irritable (I. 19. 4 ; I. 94. 12 ; VI. 66. 6 ; VII. 56. 7 ; etc.). They are playful (I. 37. 1, 5 ; V. 60. 3). They are unconquerable (I. 19. 4) and unobstructive (I. 6. 8 ; I. 186. 8). They are roarers (I. 37. 10 ; I. 166. 1 ; VIII. 7. 3 ; VIII. 7. 7 ; etc.), like a lion (I. 64. 8 ; III. 26. 5) and give rise to shaking or trembling (I. 37. 6 ; V. 54. 4 ; V. 87. 1 ; VI. 48. 20 ; VIII. 20. 14, 16). These latter characters are no doubt referable to thunderstorm closely connected with their works. They are called iron-tusked boars (I. 88. 5).

Two other characteristic features of the Maruts are their ornaments (decorations) and implements, which are unparalleled in their variety by those of other Rigvedic deities. They have decorative salves or markings on the body (añji) (I. 85. 3 ; I. 19. 2 ; V. 53. 4 ; VIII. 20. 11 ; etc.) of ruddy colour (II. 34. 16), garland round the neck (V. 53. 4), golden ornament on the breast (I. 64. 4 ; II. 34. 8 ; V. 53. 3, 4 ; V. 53. 3 ; VII. 56. 13 ; VIII. 20. 10, 22 ; X. 78. 2), turban on the head (VIII. 7, 25), golden (V. 57. 6) and shaped like the two horns of a cow (V. 59. 3) and have a bracelet round the hand, armlet round the arm (I. 66. 9 ; V. 58. 2), and anklet round the leg (V. 54. 11). Of their implements, the weapons in general are mentioned (I. 39. 2 ; VII. 56. 13 ; etc.). There is also mention of stone implement (I. 172. 2 ; V. 54. 3). Of special weapons, we have bow and arrows (I. 64. 10 ; V. 57. 2), thunderbolt (V. 54. 3 ; VIII. 7. 22) mentioned as held in the hand, axe (vāśī) (I. 19. 2 ; V. 53. 4 ; etc.) of gold (VIII. 7, 32) and javelin (I. 37. 2 ; V. 60. 3 ; V. 57. 1 ; etc.). The javelin is bright (I. 31. 1 ; I. 64. 11 ; I. 85. 4 ; I. 168. 4 ; II. 34. 5 ; V. 55. 1 ; VI. 66. 11 ; etc.), is carried on the shoulder (I. 64. 4 ; V. 54. 11 ; V. 57. 6), and is thrown by them (V. 52. 6). They are called brilliant from javelin or as associated with lightening as javelin (ṛṣṭi-vidyuta) (I. 168. 5 ; V. 52. 13). There is also mention of a toothed weapon (I. 166. 6) and of a golden armour (V. 55. 6).

The Maruts' cars are golden (V. 57. 1 ; VIII. 20. 8) with golden wheels or fellies (I. 64. 11 ; I. 88. 5). The lightenings are as if the cars of the Maruts (III. 54. 13). Their cars run over the clouds (VIII. 7, 18) and are connected with clouds from which rain goes down (I. 87. 2). There are a bow and other weapons on their cars (VIII. 10, 12). Their cars are visible during rain (V. 53. 5). In one passage (VI. 66. 7) their cars are said to be without a charioteer, without steeds, and to be givers of rain. Their cars are drawn by female steeds which are spotted (I. 19. 2 ; I. 89. 7 ; II. 34. 3, 4 ; III. 16. 6 ; VIII. 7, 28 ; etc.), golden footed (VIII. 7, 26), and are brown and ruddy in colour (I. 88. 2 ; VIII. 7, 28 ; etc.). Their cars are also said to be drawn by *niyut* horse (usually regarded as Vāyu's steed), *aruṣin* (usually taken as the sun's steed), and *hari* (the steed of Indra) (V. 52. 11; V. 54. 8; V. 56. 7). Once (V. 58. 1) the Maruts are said to have yoked the winds as steeds to their pole. Lastly, we find mention of rein and whip (I. 37. 3; I. 38. 12).

The Maruts are the sons of Rudra (I. 114. 6, 9; II. 33. 1; V. 52. 16; etc.). They are also regarded as the followers of Rudra (I. 122. 1). Their mother is spotted (*pṛśni*) (I. 38. 4; I. 89. 7; V. 52. 16; V. 60. 5; VIII. 7. 3; etc.). They are again said to have a cow as their mother (I. 85. 3) or friend (VIII. 20. 8). Their mother is *Rodasī* (I. 167. 5, 6; V. 61; 12). Rodasī is Rudra's wife (V. 56. 9).

The Maruts are associated with several deities in their works. They are closely connected with Indra (I. 101. 8; I. 169. 1; etc.), who is their brother (I. 170. 2), friend (III. 51. 8, 9), and helper (III. 35. 9; I. 168. 7). They are the followers of Indra (V. 57. 1) and appear with Indra (V. 87. 2). They are also connected in their works with Varuṇa (VIII. 81. 1), Viṣṇu (VII. 3, 21), and Vāyu (VIII. 7. 4). Lastly, Agni is a great favourite of the Maruts (VIII. 103. 14) and they are dependent upon Agni (III. 26. 5).

Coming to the consideration of their abodes, we find them invoked to come from the heaven (V. 53. 3; etc.). They live in the same place (I. 165. 1; VII. 56. 1). Their residence is luminous (I. 19. 6; I. 161. 14; V. 52. 5; etc.). They are said to remain in the highest place (V. 87. 9) and travel in the highest region of the heaven (V. 59. 7; VIII. 7. 7). Again, they are said to live in the upper, middle, and lower region of the heaven (V. 60. 6), or between the heaven and earth (sky ?) (I. 122. 1; I. 38. 2). Once (V. 52. 9), they are said to reside in the Paruṣṇī river.

We are told something of the birth and origin of the Maruts. They are said to have been born in the heaven (I. 64. 2, 4), Rudra gave birth to them in the womb of Pṛṣṇi (II. 34. 2). Their birth-place is fixed; they come out of their mother (I. 37. 9). Again, they are said to arise from lightening (I. 23. 12); Vāyu is said to have generated the Maruts for rain and for giving rise to rivers (I. 134. 4); but elsewhere (I. 64. 5) Maruts are said to have generated Vāyus and lightening. The Maruts were born together at the same time (V. 55. 3; V. 58. 5), and were born for pouring down water (V. 61. 14).

The characteristic works of the Maruts are exhibited in the pouring down of rain with accompanying thunder and storm. Firstly, they are said to send clouds, full of water (V. 56. 4), to make the clouds move (I. 19. 7; V. 54. 4), cleave the clouds (V. 54. 5; V. 52. 9; VII. 56. 17; etc.). The clouds are often referred to as a 'cow' (II. 34. 5; etc.). They are said to milk the watery place of the movable (clouds) (I. 64. 11).

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They are also said to disperse the darkness (I. 86. 10), or conversely, they are said to cause darkness during the day by clouds (I. 37. 9). Indra urged them to kill the demon Kṛṣṇa (VIII. 96. 14). Secondly, the downpour of rain is attributed to them. Various epithets are assigned to them in this connection (*vṛṣan*, I. 169. 3 ; II. 33. 13 ; V. 52. 3 ; VII. 58. 1 ; VIII. 20. 12 ; *vṛṣṇa*, VIII. 20. 9 ; VIII. 7. 23 ; *ukṣamat*, VI. 66. 4 ; I. 64. 2 ; I. 168. 2 ; etc.). They make the rain fall on the ground (V. 54. 2) from above (V. 55. 5), and soak the ground (I. 37. 9 ; I. 64. 5 ; etc.). They hide the eyes of the sun (V. 59. 5). They milk the watery place of the pṛśni (II. 34. 10) or the heaven (I. 64. 5). The rain follows their path (I. 85. 3). They make the rivers flow (V. 53. 7 ; X. 78. 6), and the seas roll (I. 19. 7, 8), soak the herbs with water (VIII. 7, 22), and know the medicinal herbs (VIII. 20, 25, 26). Thirdly, they are closely associated with lightening and thunder. They originate lightening and wind (I. 64. 5). They remain with lightening (V. 54. 2). The lightening follows them (I. 37. 8 ; V. 52. 6). When they give rise to rain, the lightenings make their appearance (I. 168. 8). The roaring of Maruts, which we have already discussed above, indicates thunder. Their roaring makes the high mountains shake (V. 60. 3) and makes the people tremble with fear (I. 38. 10). They roar when they desire to pour forth rain (V. 54. 12). Fourthly, the storm is indicated by their movements. We have indications of violent storm in the Rigveda. The Maruts ascend to high places while roaring (VIII. 7, 17). They spread all round as they move (I. 37. 10). Their movements are fierce (I. 37. 7) and unobstructible (I. 64. 3). Their movements are rhythmic (V. 52. 3 ; V. 52. 8) and slow (I. 85. 6). They travel through night (V. 52. 3). Their movements cause the earth to tremble with fear (I. 37. 8 ; V. 60. 2), dislodge fixed objects (I. 64. 3, 11), uproot the trees in the forest (I. 39. 5 ; I. 64. 12 ; V. 58. 6 ; etc.) like an elephant (I. 64. 7), and dislodge the mountains (I. 85. 4 ; V. 54. 1). They throw dust all round (I. 64. 12).

There are other minor works of the Maruts. They are destroyers of heat (V. 54. 1). As spoken in the case of several other deities, they are said to have placed the sun and the heaven and earth in their places (VIII. 7, 22). They have also fashioned the luminous path for the sun (VIII. 7, 8). They are said to hold three luminous bodies in heaven (V. 29. 1). The Maruts preserve the strength of Trita (VIII. 7, 24) who roars at the time of rain (V. 54. 2). They killed the enemy of Trita (II. 34. 10).

There is one benevolent deed on the part of the Maruts. This is depicted in several passages (I. 85. 10, 11 ; I. 88. 4 ; V. 52. 12 ; V. 57. 1). When Gotama became thirsty, the Maruts prepared a fountain for him in the heavens and gave him water to drink. This deed is also assigned to the Aṣvins (I. 116. 9).

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The Maruts have been requested to drink Soma in many passages of the ninth book. They have also been praised for a son fashioned by Vibhva, the middle one of the three Ribhus.

The Maruts are mentioned in most of the Brāhmaṇas. They are mentioned as seven in number (Śatapatha V. 5. 1, 12; 5. 4. 3, 17; Taitt. I. 6. 2, 3; etc.) or 7×7 (Yajurveda 17, 80–85; 39. 7; Śatapath. 9. 3. 1, 28). They are regarded as the leaders of the gods (Tāṇḍya 14. 12. 9; 21. 14. 3; Taitt. 2, 7, 10. 1) and their courtesans (Śatapatha. 2, 5. 1, 12; etc.; Aittareya I. 9; Tāṇḍya 6. 10. 10). They are associated with water (Kauṣ. 5, 8; Gopatha Uttar. 1. 22).

Taking into account the work of the Maruts, connected with lightening, thunder, rain, and storm, they are taken to represent the storm-gods. Plunket, in his *Ancient Calendars and Constellations*, pp. 173-4, consider the Maruts to represent the number of days that used to elapse between the crescent half-moon, blazing on the brow of Rudra and the full-moon of the summer solstice at about 4000 B.C. or earlier. But a difficulty arises when we find the Maruts as born together at the same time, and working together. Although the same traits are more or less applicable to Indra with whom they are closely associated in their works, a striking difference is discernible between the nature of Indra and of the Maruts. In no deity of the Rigveda do we find such a detailed account of anthropomorphic characteristics, including decoration, ornaments, and weapons, as we get in the case of the Maruts. This leads one to the idea of some constellation figures representing these deities. Further, their birth from a spotted mother (which we take to represent the heaven studded with stars), their abode in the heaven, the brightness of their ornaments, decorations and weapons, and their spotted steeds all go to confirm the same view. But we are unable to advance further than this, as we have no materials for finding out which constellation figures they actually represent. It is quite possible that they might have represented a number of small figures comprising some brilliant stars in the neighbourhood of the sign Sagittarius, which we have already taken to represent the god Rudra. The river Paruṣṇī perhaps represents the milky way lying near by. The association with Indra shows that the summer solstice was placed close to them. We can easily interpret all the works which are common to both the Maruts and Indra.

4. *Vṛṣākapi.* This term occurs several times in X. 86. He is Indra's favourite (X. 86. 1, 12). He is foremost in stoutness (X. 86. 1) and is a tawny beast (X. 86. 3). He has been considered as very destructive and a desire is expressed to behead him (X. 86. 5). He is said to have been beaten by a dog chasing a boar (X. 86. 4). When Indra and Vṛṣākāpi climb up, the evil-doing beast disappears (X. 86. 22). It has been prayed that Vṛṣākapi may receive a dagger, belt, and a cart load

(X. 86. 18). Lastly, his wife is mentioned and her bull was to be partaken of by Indra (X. 86. 13). In Gopatha Brāhmaṇa (Second part, 5. 19), he is regarded as an āditya.

The term 'Vṛṣākapi' has been shown by Hornell to be a Dravidian word signifying 'male ape'. But considering the above characteristics depicted in the Rigveda, we are inclined to take him to represent the constellation Orion. The dog biting his ear is the star Sirius in the constellation Canis Major. The boar chased by the dog is the constellation Lepus. Lepus is ever chased by Sirius (see Brown's *Primitive Constellations*, Vol. I, p. 97).

VII. ATMOSPHERIC OBJECTS.

1. *Vāyu and Vāta.*

Vāyu is invoked in three complete hymns and parts of eight others. Vāta is celebrated in two short hymns. They are, in addition, praised or otherwise mentioned in some hundred and fifty passages. Their names sometimes occur together in the same passages (VI. 50. 12; X. 90. 13; etc.). Vāyu has also been invoked with Indra in one complete hymn, in several passages of another hymn, and in some fourteen scattered passages. He has also been praised with Agni, Sūrya, Asvins, Viṣṇu, Maruts, and some other deities. Vāta is associated with Parjanya.

Vāyu has usually been addressed as a single person, but in one passage (II. 11, 14) there is mention of many Vāyus. The word Vāta has been used in the singular, the dual (*vātau*) (X. 137. 2) and many times in the plural (Vātāḥ).

Vāyu is regarded as the chief of the gods (VIII. 26. 25). He is the son-in-law of Tvaṣṭṛ (VIII. 26. 21). Vāta is regarded as the messenger of the gods (X. 137. 3).

Vāyu is visible (I. 2. 1) and white in colour (VII. 91. 3). Vāta is regarded as widespread (X. 89. 11); he is recognised by his movement as his form is not visible (X. 168. 8). Of other physical features, we find that Vāyu is not still (X. 168. 3), he is always moving (II. 11. 3), and is swift (X. 106. 7). This movement is specially connected with Vāta in many passages. The swiftness of Vāta has been used many times as a standard of comparison for the motion of many objects (V. 31. 10; VII. 36. 3; VIII. 1. 11; etc.). Vāta is said to blow (I. 28. 6; X. 137. 3) during rain (V. 83. 4). He is also said to move to and fro (IX. 97. 52). He travels in the sky (II. 38. 2) and comes from the sky (I. 161. 14). He blows downwards (X. 60. 11). He has been requested to blow without heat (VIII. 18. 9) and not to blow unfavourably (I. 29. 6). He cannot be held fast (X. 95. 2). The strength of Agni is compared with that of Vāyu (VI. 4. 5). Vāta is said to roar in the sky (IV 22. 4) as thunder (X. 168. 1). We know Vāyu's wrath (VII. 62. 4).

Vāyu has a chariot (VII. 90. 1). The chariots are one hundred in number (II. 41. 1). The chariot is golden-fellied (IV. 46. 4). Indra is the charioteer of Vāyu (IV. 46. 2; IV. 48. 2). The steeds of Vāyu's chariot are known as *Niyut* (I. 134. 2; II. 41. 1; III. 35. 1; IV. 46. 2; VII. 23. 4; etc.), perhaps referring to their great number. They are said to be ninety-nine (IV. 48. 4), a hundred (IV. 48. 5; VII. 92. 5), a thousand (I. 135. 1; IV. 48. 5; VII. 92. 1; etc.) or ten thousand (I. 135. 3) in number. Again, Vāyu's chariot is drawn by a pair of red or ruddy horses (I. 134. 3). Vāyu's steeds are strong (I. 134. 1 ; I. 135. 9), stout like a bull (I. 135. 9), swift (I. 135. 9) like mind (IV. 48. 4), and have wide flanks (VIII. 26. 23). They carry Vāyu between the heaven and earth (I. 135. 9).

As regards Vāyu's origin, we are told that Rodasī generated him for wealth (VII. 90. 3). Again he is said to have arisen from the life (*prāṇa*—vital force) of *Puruṣa* (Divine Being) (X. 90. 93). Maruts, again, gave origin to the Vātas (I. 64. 5).

Vāyu and Vāta are connected with several deities in relation with their works. Vāyu is connected with the Maruts. He has originated the Maruts for the production of rain and rivers (I. 134. 4). Vāyu travels with the Maruts (VIII. 7. 4) and the Maruts go up with the help of Vāyu (VIII. 7. 3). Dawns spread the light for Vāyu (I. 134. 4). The Asvins drink Soma at the end of the day with Vāyu and Niyut (III. 58. 7). The heaven and earth follow Vāyu (IV. 48. 3). Agni is made to appear by Vāyu (V. 19. 5). But Vāta is more intimately associated with Agni ; and this association is depicted in various ways. Agni runs along the path of Vāta (II. 14. 3 ; V. 5, 7). Vāta remains round the fire (X. 115. 4). Vāta blows towards the flame (I. 148. 4). Agni unites with the force of Vāta (IV. 7, 11). Vāta is also connected with Varuṇa (VII. 87. 2). Varuṇa knows the path of Vāta (I. 25. 9).

We now come to the works of Vāyu and Vāta. The clouds are made to go up by the Vāyus (VIII. 7. 3). Vāta, again, is sent by the roaring clouds (IV. 17. 12). Vāta spreads the cloud (I. 116. 1). Vāyu is the friend of water (X. 168. 3). Vāta is the downpourer of rain (I. 122. 3 ; VII. 40. 6) and is the soul of the world in this respect (VII. 87. 2). He agitates the water by his force and separates the weeds from the water in a pool (X. 168. 5). Vāta makes the forest tremble (V. 78. 8 ; X. 23. 4) and shakes the fixed objects (X. 168. 2). He breaks down the trees as he comes (X. 168. 1).

We are also informed of something more about them. Vāyu dries everything (VI. 37. 3). Vāta remains in our body as the soul (I. 34. 7). Vāta is regarded as a medicinal agent for the living world (X. 137. 3). Vāta has been addressed for bringing nectar from his storehouse (X. 186. 1), for bringing medicine (I. 89. 4 ; X. 137. 3), for prolongation of life (X. 186. 1), and for protection from the disturbances of the sky (X. 158. 1). He has also been invoked for fanning the cows (X. 169. 1). Deadman's breath is said to come to Vāyu (X. 16. 3).

We have numerous references to Vāyu in the Brāhmaṇas. Vāyu is regarded as the presiding deity of Svāti (one of the lunar asterisms) in the ancient astronomical treatises.

It is quite evident that Vāyu is a personification of wind, particularly in connection with rain and thunder. Vāta represents the functional principle (element) of wind.

2. *Dāsas and Asuras killed by Indra.*

Scattered through the Rigveda are found a large number of names, occurring from once to many times, many of which are qualified as *dāsas*. I propose dealing with them here in alphabetical order.

(1) *Atka*. This name occurs once only (X. 49. 3) ; and we are told that Indra killed *Atka* for the benefit of Kavi by beating him. The word also occurs elsewhere (I. 122. 2 ; V. 55. 6 ; V. 74. 5), where it is used for a garment, cloth or covering. In Naighaṇṭu, the meaning of the word is given as a flash of lightening. The name Kavi may perhaps refer to Bhṛgu's son, the author of IX. 47–9 and 75–9. We are inclined to believe that the demon is here a personification of the cloud, thought of as envelope of the rain-water, or, following the meaning given in Naighaṇṭu, the deity of lightening.

(2) *Anarśani*. The name occurs once only (VIII. 32. 2). We are informed that Indra, having made the waters flow, killed *Anarśani*, *Piprudāsa*, and *Ahīśuva*. The word *anarśani* may be derived from *na*, not, and arśani from the root *ṛṣ*, to break, to make to flow (as *arśa*, hæmorrhoid) and thus to mean that which does not cause to flow ; or conversely, that which stops the flow. Hence we are led to conclude that *Anarśani* may be the deity presiding over drought. Whether the term imports the same idea as *śuṣṇa* or not will be discussed in connection with the latter. Following Johansson, Macdonell believes it to preserve 'a historical reminiscence of a prominent terrestrial' foe (*Vedic Mythology*, p. 162).

(3) *Arbuda*. The term occurs seven times. In one place (X. 67. 12) *Arbuda* is said to be possessed of a large collection of water. Indra beheaded Arbuda with the help of Bṛhaspati (X. 67. 12). We are also told that Indra strengthened by Trita, killed *Arbuda* (II. 11. 20) and that he killed *Arbuda* with his face looking down (V. 14. 4). We are further informed that he attacked *Arbuda* with his feet (I. 51. 6) and pierced him with cold (ice) (VIII. 32. 26). Lastly, we see that Indra killed *Vṛtra* with his big bow, killed the deceitful *Arbuda* and *Mṛgaya*, and drove out the cows from the mountain (VIII. 3. 19).

The term *arbuda* occurs in the Gaṇapāṭha of Pāṇini. Yāska gives two meanings of *arbuda*—cloud (3. 10. 1), and an embryo, fortnight old (14. 6). According to Roth (his Wörterbuch) the term also means snake, or a snake-like swelling. Macdonell (*Vedic Mythology*, p. 161) places *Arbuda* in the same category as Vṛtra. Considering that *Arbuda* is possessed of a large mass of water and following Yaska's explanation of the term, we may take it as the personification of cloud. Further, the piercing of *Arbuda* with ice (if we can take *hima* to mean ice) evidently points to the formation of ice on the top of the mountains upon which the clouds impinge, and the driving out of cows from the mountain may either simply refer to cows or figuratively to small collections of clouds on the mountain sides. Indra's bow is the rainbow. It is beyond doubt that the phenomenon depicted in some of the passages at least refers to what actually occurs in the higher altitudes. Large masses of ice accumulate on the top of the mountains above the snow line in the winter. As the temperature of the atmosphere rises on the advent of the summer, the ice sheets begin to melt and clouds are also formed on the top of the mountains in close proximity to the snow. The setting free of rains from the accumulation of water-vapour in the form of the above-mentioned clouds on the top of mountains completes the picture. Hence we may take *Arbuda* as mountain clouds which adhere in large masses to mountain peaks and flanks about the snow line.

(4) *Aśna*. The word occurs seven times in the Rigveda. In two passages we are told that Indra killed *Aśna* with ease (II. 14. 5) and destroyed his residence, after having made the dawn disappear by the sun (II. 20. 5). In another place (VI. 4. 3) Agni is said to have destroyed the dwelling of Aśna. In three other places (I. 164. 1 ; I. 173. 2 ; X. 27. 15), the term is applied to Indra as the ' consumer ' of the offerings ; in another (VIII. 2. 2) it means the stone (which was used to grind the Soma plant to extract the juice). The term occurs in Nirukta (2. 21. 2) as a synonym of the cloud. Taking into consideration that Aśna is killed and his residence is destroyed at sunrise by Agni (celestial fire, the sun), and Yaska's explanation of the term, we are inclined to believe that Aśna represents the ' morning fog '. As soon as the sun rises and the temperature of the atmosphere becomes higher, the minute water particles of the fog evaporate and the fog clears away.

(5) *Ahi*. The term occurs more than fifty times. Whereas it is principally used for a distinct personality as *Ahi*, it is also used to qualify *Vṛtra* in five places (I. 32. 5, 8, 11 ; I. 51. 4 ; I. 80. 13). Leaving aside these latter passages for the present, I shall study the characteristics of *Ahi* as noted in the others.

Ahi has been variously described as obstructing or covering the waters (I. 51. 4 ; II. 11. 2 ; II. 19. 2 ; III. 32. 11 ; V. 30. 6 ; VI. 72. 3 ; VII. 21. 3 ; X. 111. 9), lying in water (II. 11. 5) or lying in a watery region (IV. 17. 7). He has also been called a roarer (VI. 10. 10). He has been mentioned as remaining in a lying posture (I. 100. 7 ; II. 12. 11 ; V. 30. 6 ; V. 32. 2) and as sleeping in a recumbent posture (IV. 19. 3). *Ahi* has also been described as discontented, spread out, unintelligible, not possessed of life, lying in recumbent position, unjointed, and of creeping habit (IV. 19. 3). He is said to have caused the appearance of lightening, the roaring of the cloud or the pouring down of rain, and to have thrown a bolt against Indra (I. 32. 13). *Ahi* lives in a cave, remains concealed, incapable of being seen and is a terror of the sky and heaven (II. 11. 5). Lastly, we get the mention of his hands (I. 103. 2). I shall now deal with the conflict between *Ahi* and Indra. First, we are informed that Indra killed or pierced Ahi (I. 103. 2; II. 19. 2; III. 32. 11; III. 33. 7; V. 32. 2; VIII. 93. 2) with his thunderbolt (IV. 22. 5) or with an arrow (I. 32. 3—with which he killed the first of the Ahis which appeared), being strengthened by Soma-juice (II. 15. 1; V. 29. 3) and with the help of Soma (IV. 28. 1; VI. 72. 3), or Viṣṇu (VI. 20. 2), or the Maruts [who sided with Indra (X. 113. 3)]. We are also told that Indra drove away *Ahi* from the earth (I. 80. 1), waked up the sleeping *Ahi* by his bolt (I. 103. 7), tortured *Ahi* (V. 31. 7), melted away (?) *Ahi* from the sky (VIII. 3. 20), and put *Ahi* to everlasting sleep by killing him (VI. 17. 9). Indra had great brilliancy at the time of killing Ahi (X. 96. 4). Secondly, we are told that Indra pierced *Ahi* for water (X. 113. 8), he sent forth waters obstructed by *Ahi* (VII. 21. 3). Again, we find that Indra, having killed *Ahi*, poured down rains (I. 32. 3), released the waters (X. 133. 2) and made them flow (II. 19. 2; V. 29. 2), and even made seven rivers flow (II. 12. 3). Thirdly, Indra brought into view the sky, dawn, and the sun after he had killed *Ahi* (I. 32. 4). The moving gods' wives prayed Indra when he had killed *Ahi* (I. 61. 8).

Let us now consider some other passages connected with *Ahi*. (i) The weapon of Bṛhaspati is daily directed against *Ahi* (I. 190. 4). (ii) O Indra! whom did you see as the slayer of *Ahi* when you were frightened in heart with the desire of killing (Ahi) and crossed ninety-nine flowing rivers like the falcon? (I. 32. 14). (iii) O Indra! you brought out Agru's son from the anthill; thus brought out, he was able to see Ahi although he was blind; when he came out, his joints splitting off the pot (coming out by breaking asunder the pot) remained together (IV. 19. 9).

As the physical characteristics of Ahi are more or less similar to those of Vṛtra, apart from the fact that Ahi has been taken to be identical with Vṛtra in some passages, I shall discuss the physical features of the both together under Vṛtra.

(6) *Ahīśuva*. We get this term in three places: Indra killed *Vṛtra*, *Aurṇvābha*, and *Ahīsūva* (VIII. 32. 16) by delivering water (VIII. 32. 2). Indra's mother said that there are many like *Ahīsūrva*, *Aurṇavābha*, etc., who should be saved (VIII. 77. 2).

We may derive the word from *Ahī*, the cow (Nirukta 3, 9, 11), and *śu*, to go, to move, and may signify it as 'one moving like a cow'. Taking into account the passage where we find that *Ahīśuva* should be saved, we may infer that it represents something which was useful to the people; and in view of the above significance of the name (although taken with some doubt), we are inclined to conclude that ahīśuva really represents some cow-like wild beast (as gomṛga or some other such animal), which was killed, perhaps in large numbers, during the rains and storms.

(7) *Ilīviśa.* In a single passage (I. 33. 12), we are told that Indra pierced the strength (stronghold) of *Ilīviśa.* Yaska (Nirukta 6. 2, 14) takes it to be a synonym of the cloud. We may consider its significance in another way. We may (although doubtfully) derive the word from *ilī*, a stout stick of wood, and *viś*, to pervade, to enter into ; and make it mean a collection of trees (a small forest) from which stout sticks (weapons) were prepared. In such a case it is quite reasonable to think of the uprooting of trees by storm, as one of the feats of Indra.

(8) *Ibha, Tugra, Tūtuji, Daśamāya, Daśoni, Vetasu, and Smadita.* These names of very obscure import occur in some three passages. We are informed that Indra killed *Tugra* and *Vetasu* (VI. 24. 4), that he placed *Ibha, Tugra, Tūtuji, Daśamāya, Daśoni*, and *Vetasu* under the control of Dyotana (VI. 20. 8) and that he placed *Tugra* and *Smadita* under the power of Kutsa (V. 49. 4). We are further told (in many passages) that Tugra's son Bhujyu was rescued by the Asvins ; I shall discuss this event in another place.

Without any other evidence, we shall have to depend upon the doubtful significance of the names of the demons. *Ibha* means 'elephant' or 'one from whom fear is gone' (*gatabhīta*) (Nirukta 6. 12. 1). Knowing that *Tugrya* (Nirukta 2. 24. 2) or *Tugriya* (Pāṇini) means water or Tugra's descendant, we may take *tugra* to mean snow, ice or cloud. *Tūtuji* means 'hastener' or 'promoter' (Nirukta 3, 9. 15 ; 6, 20. 1). *Daśamāya* literally means 'one having ten tricks'. *Daśoni* literally means 'one having less than ten'. *Vetasu* can be derived from *Veta*, reed or cane, and *su*, to move, and thus may be made to mean 'one moving the reeds'. *Smadita* means 'one attended by followers'. Again the term *dyotana* has been used in one place (VIII. 29. 2) to qualify Agni and means 'glistening'; hence we may apply the same meaning here and signify it as 'a glistening one' (the sun ?). We may now speculate (since we cannot be the least definite in this matter) regarding their physical basis. We may take *ibha* to represent water flowing through the plains, *tugra* the snow on the top and the sides of the mountains melting into water, and *tūtuji* the waters (waterfalls) rapidly flowing down the mountains. *Daśamāya* and *daśoni* might have been meant to represent large stretches of water dividing into many or fewer arms or branches as they flow down the mountains. *Vetasu* was perhaps meant for floods in low marshy places abounding in reeds, etc. Lastly, *smadita* might well have represented glaciers flowing down the mountains, the big floating pieces of ice, boulders, and uprooted trees being its followers.

(9) *Uraṇa*. This term occurs once (II. 4. 4). We are told that Indra killed ninety-nine *uraṇas* showing their arms. Macdonell (*Vedic Mythology*, p. 152) refers to it as a demon named 'ram'. Yāska gives the meaning as 'sheep' (Nirukta 5. 21. 3). We are thus inclined to represent *uraṇa* as the sheep which are killed in large numbers during rain and thunderstorm. We may also take an alternative figurative meaning by representing *uraṇa* as pine or fir trees with spreading branches (arms) and with needle-shaped leaves representing the hairs of *uraṇa*) which are uprooted during the rain and storm.

(10) *Aurṇavābha*. The word is found in three places. We are told that Indra killed *Aurṇavābha* (II. 11. 18; VIII. 32. 26). We also see that Indra's mother said that there were many like *Ahīsūva*, *Aurṇavābha* who should be saved (VIII. 77. 2). Aurṇavābha has been translated as the 'spider brood' by Macdonell (*Vedic Mythology*, p. 152). If we take into account the passage in which it is noted that *Aurṇavābha* should be saved, we should take it to represent something useful to the people. It may thus mean some woolly beast (as Yak or some other animal like it). It is thus easy to conclude that useful beasts like the present one were killed through the agency of rains and storms.

(11) *Kuyava*. The term occurs about seven times. We are told that Indra killed *Kuyava* (I. 103. 8), that Indra brought *Śuṣṇa* and *Kuyava* under control (VII. 19. 6) for the sage Kutsa (II. 19. 6), and that Indra killed *Kuyava* at the beginning of the day (IV. 16. 12) and broke the wheel of the sun's chariot (IV. 16. 12) or stole the same (VI. 31. 3). We find two passages in which there is mention of Kuyava's two wives. The passages are more or less obscure and we may translate them as follows: (1) The dweller of the atmosphere (that is, *Kuyava*) himself diffuses all round; he himself dips down and disperses the foam. The two wives of Kuyava become bathed in the foam; may they be killed in the current of the stream (I. 104. 3). (2) The place of origin of *Ayu* placed above is concealed; the powerful (demon) grows from above (the waters) and appears. The straight-flowing (*anjasi*), one flowing in a curved manner (*kuliśī*), and the wife of the mighty (*vīrapatnī*) having satisfied him with their waters feed him with them (waters) (I. 104. 4).

The oriental authors (Macdonell, *Vedic Mythology*, p. 161) take *kuyava* as qualifying *śuṣṇa*, but I take him to be a distinct and separate demon. Whereas in two passages (II. 19. 6; VII. 19. 2) we may take either significance, in the other three (I. 103. 8; IV. 16. 12; VI. 31. 3) the construction is such that one is inclined to take the latter view. Further, we have mention of Kuyava's wives without the mention of Śuṣṇa (I. 104. 3). If we accept the meaning of Kuyava as 'causing bad corn or harvest' (as held by Macdonell, p. 161) referring to barley, we find that this demon was destructive to barley, the only or principal food crop in Rigvedic period. Nowadays barley is and can only be cultivated in the Punjab at higher altitudes and in the winter. It can only be grown in a comparatively dry place with a dry atmosphere; and the Punjab has the lowest rainfall of the Northern India and has very little winter monsoon. We may take it for granted that the physical features of the province has not changed from the Vedic times so greatly as to affect the crop. Taking these facts into consideration, the characteristics of *Kuyava* (I. 104. 3) and the fact that Indra killed *Kuyava* at the beginning of the day, we are led to the idea that *Kuyava* is the personification of 'fog' appearing in the extremely cold winter night and continuing to the morning. As the temperature of the atmosphere becomes 0°C. the fog drops freeze on the surface of vegetation as granular hoar-frost. The vegetation suffers great damage from the freezing of the juice (cell sap). Thus hoar-frost is greatly injurious to the young flowering shoots of the crop (see *Encyclopædia Britannica*, 14th ed., Vol. 9, article 'frost'). Further, if we take the breaking or stealing away of the wheel of the sun's chariot as a figurative representation of the late sunrise in the winter (as well as the obstruction to the sun's rays to reach us by the fog), we have further evidence for our conclusion. That *Kuyava* is different from *Śuṣṇa* is realized when we see that Indra poured down water and filled the wells after killing *Śuṣṇa* and that nothing of this sort is said of *Kuyava*.

We doubtfully consider the two wives as representing the hoar-frost and small pieces of ice floating on the surface of the streams. The two passages (I. 104. 3, 4) probably refer to the idea of the formation of fog from the evaporation of water from the surface of the rivers.

The reference to the sage Kutsa for whom Indra controlled *Kuyava* probably indicates an unusual occasion in the lifetime of Kutsa when there was a conspicuous absence of frosty weather.

(12) *Kuyavāca*. A single passage (I. 174. 9), indicating that Indra killed *Kuyavāca* for the king Duryoni, occurs in a hymn composed by a sage other than those who composed the passages on *kuyava*. It is probably identical with *Kuyava*.

(13) *Kṛṣṇa*. The terms *kṛṣṇa* and *kṛṣṇā* occur many times in the Rigveda. Except in some seven ṛks, they have been used to mean darkness (I. 92. 5; I. 115. 5; IX. 66. 24; X. 89. 2; etc.), dark night (I. 113. 2; III. 55. 11; VI. 9. 1; X. 3. 2; etc.), charring due to burn (IV. 7, 9; VI. 60. 10; VII. 3. 2; X. 20. 9; etc.), the smoky flame (X. 21. 3), the dark cloud (I. 79. 2; I. 164. 47; IV. 17. 14), the black cow (I. 62. 9; IV. 3, 9; etc.), the black-spotted antelope (X. 94. 5) and the dark-complexioned sage Kaṇva (X. 31. 11). Varuṇa's rays are some dark (black) and some white (VIII. 41. 10). Lastly, in another verse (IX. 41. 1) we are told that Soma, becoming brilliant, movable, and

swift like water removes the darkness. This no doubt refers to moonlight destroying the darkness of the night.

The seven hymns referred to above describe the conflict between *Kṛṣṇa* and Indra. We are told that Indra, with his brilliant energy (III. 31. 21) and with the help of Ṛjiśvan (I. 101. 1), killed (I. 101. 1) or destroyed (III. 31. 21) *Kṛṣṇas*, 50,000 in number (IV. 16. 13) or those with dark womb (I. 101. 1). Indra destroyed the dwelling place of the *Kṛṣṇas* (IV. 16. 13). He kills *Kṛṣṇa* by taking off the dark covering (skin) and reduces him to ashes (I. 130. 8). Lastly, in three passages, we are told (i) that *Kṛṣṇa* with his 10,000 (men) was waiting on the bank of Aṃśumatī river; Indra by his diligence (śacī) found out the roarer and killed them all for the benefit of men (VIII. 96. 13), (ii) that Indra, finding the fast-moving *Kṛṣṇa* travelling in a wide area at some concealed place of Aṃśumatī river asked the Maruts to kill him (VIII. 96. 14), and (iii) that Indra, finding the fast-moving *Kṛṣṇa* holding his body prominently near the river Aṃśumatī killed him and his lightless, coming soldiers with the help of Bṛhaspati.

We are inclined to believe that the demon *Kṛṣṇa* is a representative of the 'dark cloud' for the following reasons: (i) The term has been applied to darkness in other places. (ii) Its characteristics as a roarer, fast-mover, and one destitute of light. (iii) The presence of a dark womb. (iv) The intervention of the Maruts, indicating high winds or storms accompanying (or causing) their dispersal.

Two peculiarities to be noticed in some of the passages on the conflict between Indra and *Kṛṣṇa* are that no rainfall is mentioned in this connection and that the Maruts intervened in the conflict. We know (*Enc. Brit.*, 11th ed., Vol. 6, article 'cloud,' p 558; *Ibid.*, 14th ed., Vol. 5, article 'cloud,' p. 852) that there is a form of cloud, named *Strato-cumulus*, which consists of large globular masses or rolls of dark or dull grey colour frequently covering the whole sky; it does not bring rain. Further, owing to the numerous rolls, the authors of the verses probably referred to them in the plural number. The Aṃśumatī river may be an earthly river or more probably the bright Milky Way.

(14) *Cumuri and Dhuni*. The two demons have been mentioned, always together, in six passages. They have also been mentioned with *Pipru*, *Śuṣṇa*, and *Śambara* in one ṛk (VI. 18. 8). The word *dhuni* has elsewhere been used for the river (II. 15. 5; II. 30. 2; V. 87. 3) and as qualifying Indra causing trembling (V. 34. 8) of the enemies (I. 174. 1; X. 89. 5), the Maruts as roarers (I. 64. 5; VII. 56. 8; X. 95. 3) or trembling (VI. 5. 5; VI. 66. 10; X. 78. 3) or causing trembling (I. 87. 3; V. 60. 7; VIII. 20. 14), the earth as trembling (I. 87. 3) and the cloud as trembling like the skin of the horse (X. 149. 1). In

one place (II. 15. 5) we are told that Indra lessened the amount of water of this (some particular) large river for crossing it; he made those cross the river safely who were unable to do so. This passage evidently refers to the drought of the summer before the onset of rain. Considering the demons, we find that Indra killed them both (VI. 18. 8; VI. 26. 6; VII. 19. 4; X. 113. 2) for the king Dabhīti (VI. 26. 6; etc.); he sent them to sleep in favour of Dabhīti (II. 15. 9; VI. 20. 13). Lastly, we are told that he killed *Cumuri*, *Dhuni*, *Pipru*, *Śambara*, and *Śuṣṇa* (VI. 18. 8).

Cumuri may be derived from *cu*, to make noise, to sound, and *mur*, to encompass, to surround, and may be made to signify 'one which produces sound and surrounds all sides'. *Dhuni* is derived from *dhun*, to roar and may mean 'a roarer'. Taking the above meanings we consider them to represent 'clouds which give rise to sounds'. *Cumuri* may be made to represent that form of cloud which spreads all round and produces a wild sound. *Dhuni* may be made to represent the typical form of 'thundercloud' or *cumulonimbus*, characterized by thunders, lightening and storms, generally followed by local showers of rain (*Enc. Brit.*, 11th ed., Vol. 6, p. 559; 14th ed., Vol. 5, p. 852).

(15) *Dāsa*. The term occurs in a large number of passages. That the word was primarily used for the original inhabitants of the country, who were different from the Aryans, appears from the passages in which they are mentioned in contrast with the Aryans (VI. 22. 10; VIII. 51. 9; X. 38. 3; etc.) and from such passages as 'Aryans are equal in match with the Dāsas' (X. 108. 3). We also see that the Aryans used to accept gifts or presents from the Dāsas (VIII. 46. 32), and that the Aryans used to pray for getting a hundred Dāsas (VIII. 56. 3). These Dāsas were employed as servants (VII. 46. 7). Again, owing, no doubt, to constant warfare between the Dāsas and Aryans, the Dāsas were really the enemies of the latter; and we find all sorts of prayers by the Aryan sages against the Dāsas addressed to the deities and particularly to Indra (II. 20. 6; IV. 18. 9; VIII. 24, 27; etc.). Along with these prayers we find mention of many characteristics of the Dāsas. We are informed of their strength (VIII. 40. 6), their anger (I. 101. 2), their mischievousness (II. 20. 6), particularly to the *sādhus* (VI. 60. 6), their soldiers (IV. 18. 9), and of their nature—they do not perform yajña and do not follow the usual rites; their (religious) performances are quite peculiar and they cannot be considered as human beings (X. 22. 8). Further, we have mention of Dāsas, as Navavāstva and Bṛhadratha (X. 49. 6), Dāsa-kings, as Yadu and Turvā (X. 62. 10) and Dāsa's wives (I. 32. 11; III. 12. 6; V. 30. 5; VIII. 96. 18). Lastly, considering the loss and injury from the various natural phenomena, the vedic sages figuratively took them as demons

and qualified them as Dāsas. Thus Ahi (II. 11. 2), Kuyava (VII. 19. 2), Namuci (V. 30. 7, 8; VI. 20. 6; X. 73. 7), Pipru (VIII 32. 2), Varci (IV. 30. 15; VI. 47. 21), Vṛsaśipra (VII. 91. 4), Viśvarūpa (X. 99. 6), Śambara (IV. 30. 14; VI. 26. 5; VI. 47. 21), and Śuṣṇa (VII. 19. 2) have all been designated as *Dāsas*.

(16) *Dṛbhīka*. The term occurs once (II. 14. 3) where we are told that Indra killed *Dṛbhīka*. We can derive the term from *dṛbh*, to be afraid of, and thus make it mean 'something of which one is afraid'. We are unable to say whether it may or may not mean long continued drought which was destructive to the crop and was thus the cause of great anxiety on the part of the Vedic sages.

(17) *Namuci*. The name is found nine times in the Rigveda. He has been called *āsura* (demoniacal) (X. 131. 4) and Dāsa on several occasions (V. 30. 3; etc.). We are told that Indra killed the trickful *Namuci* (I. 53. 7; II. 14. 5) and that he killed *Namuci* and *Vṛtra* (VII. 19. 5). Indra beheaded *Namuci* with water foam (VIII. 14. 13). He twisted Namuci's head (V. 30. 7) and twirled off his head turning it like a piece of stone (V. 30. 8). Namuci's wives were like weapons (that is, were his soldiers); knowing that they would be able to do nothing against him, Indra kept under lock his (Namuci's) two favourites inside his (Namuci's) house and then went to fight with Namuci (V. 30. 9). We are also told that Asvins came to help Indra in his conflict with Namuci (X. 131. 4) and when Indra crushed the head of the mischievous Namuci, protected Namī sāpya (*sāyya*—the idle, sleeping) and provided him with an enormous amount of money and food, the falcon carried the intoxicating Soma to Indra (VI. 20. 6). Lastly, we find a long story of this conflict in Śatapatha Brāhmaṇa (15. 7. 3. 1–3), Taittiriya Brāhmana (1, 7. 1. 6-7), and Tāṇḍya Brāhmana (12. 6. 8). The purport of the story is this: Namuci got the boon that he will not be killed at night or day, not by a rod (*lāṭhi*), blow, slap or fist, and not by drought or moisture. When Indra took a vow to kill him, Aśvins and Sarasvatī shed water foam like a thunderbolt Vajra and produced neither drought nor moisture and Indra was able to kill Namuci in the early morning before sunrise, neither at day nor at the darkness of night.

The word *namuci*, is derived from *na-muci*, meaning 'not letting go' (Pānini VI. 3, 9), that is, not giving rise to rains. This idea is further strengthened if we take *aśman* (V. 30. 8) to mean cloud (as held by Sāyana) instead of a piece of stone which (latter), however, seems to be more appropriate. Again, instead of taking *Namī sāpya* as a person, we may consider it to be a fertile field (?) [*Nami* from *nam*, to cause to sink or soak (water) and *sāpya*, relating to fertilization]. Thirdly, we find that Namuci can only be killed by foams of water and only in the morning between night and sunrise. Taking these facts into consideration, we take Namuci to be a representation of 'the morning fog of winter in the valleys abutting on fast-flowing rivers'. We are particularly reminded of the condition towards the end of the winter when the period of bitter cold has passed and ice and snow have begun to melt. This condition is perhaps referred to when we are told that *Namuci* was killed by the foams of water. The melting of ice results in the swelling of the rivers with the formation of strong currents and formation of much foam, as they flow down the valleys. The whole night (sometimes the whole day as well) remains shrouded in such fog, to be cleared up only in the morning before sunrise. Such fog, owing to a comparatively warmer atmosphere, instead of giving rise to frosts or frozen water, simply settles as moisture on th[illegible]d and improves the fertility of the soil. This condition, in my opinion, is referred to when we are told that Indra protected the idle *Namī sāpya* whom he provided with an enormous amount of money and food. We understand that the valleys, formerly lying barren without vegetation, now becomes fertile with moisture and produce plenty of crops.

The association of the Asvins, whom I have already shown to be identical with the two twin stars of *Asvinī* (α and β Arietes (*Indian Historical Quarterly*, Vol. VI, 1, 1930, p. 172), with Indra in the conflict with Namuci indicates that they used to rise above the horizon in the early morning at that time. This approximately corresponds to the time when the vernal equinox was passing through the end of the *bharaṇi* (35 Arietes), i.e. about 1350 B.C.

The falcon seems to be the constellation *Aquila*, which also used to appear high up in the sky, the moon remaining near the constellation. We know that *Śravanā* (Altair), the junction star of the asterism is placed in the neck of the constellation figure of Aquila.

(18) *Pipru*. This demon, designated both as an *Asura* and *Dāsa*, has been mentioned some eleven times. We are told that Indra killed *Pipru* (I. 101. 2 ; I. 103. 8 ; II. 14. 5 ; etc.) or destroyed his strength (X. 138. 3) or brought him under control (V. 29. 11) for Ṛjiśvān (IV. 16. 13 ; X. 138. 3). We also find that Indra destroyed or broke down the dwelling place of *Pipru* (I. 51. 5 ; VI. 20. 7) and thereby protected Ṛjiśvān (I. 51. 1) and gave money (wealth) to him (VI. 20. 7). He also broke the cow-shed of *Pipru* (X. 99. 11) with his bolt. Lastly, we see that Indra killed *Anarśani*, *Ahīśuva*, *Pipru*, and *Sṛbinda* by pouring down water (VIII. 32. 2).

The word *pipru* has been derived from *pṛ* or *par* (by reduplication) meaning 'resister, antagonist' (see Macdonell's *Vedic Mythology*, p. 161). Finding that Indra kills him for water, we may take *Pipru* to represent some form of cloud. Taking into account the significance of the name, I am inclined to take it to mean some persistent form of cloud which, after causing much distress by oppressive heat, ultimately ends in rain. It may be some form of *nimbus* (*Enc. Brit.*, 11th ed., Vol. 6, p. 559).

(19) *Mṛgaya.* This is mentioned in three places, once with *Pipru* (IV. 16. 13) and once with *Arbuda* and *Vṛtra* (VIII. 3, 9). He has been called 'swollen' or 'provided' with growth (IV. 16. 13). We are told in one place (IV. 16. 13) that Indra killed him for Ṛjišvān and in another place (X. 49. 5) that he was placed under the control of Srutarvāra. Lastly (VIII. 3. 19), we are told that he killed the trickful *Mṛgaya* and others with his big bow and drove the cows out of the mountains.

Mṛgaya has been taken by oriental scholars to qualify *Pipru* (*Vedic Mythology*, p. 161); but we are unable to do so in consideration of the three passages in which the name occurs. The word literally means a beast chased in sport. Taken figuratively, we are inclined to conclude that it represents a fast-moving fog which passes over the mountains, being chased by high winds and which spreads out to surrounding places. The 'cows' seems to indicate small masses of clouds (or fogs) on the sides or tops of the mountains. The bow is the rainbow.

(20) *Rudhikrā.* In one passage (II. 14. 5) we are told that Indra killed *Namuci*, *Pipru*, and *Rudhikrā*. We can derive the word from *rudhi*, bank (of a stream) or slope (of a mountain) from *rudh*, to obstruct, to withhold, and *krā*, from *kram*, to cover, to extend over; and we may thus infer something which covers the banks of rivers or the slopes of mountains. In such a case, considering that it is mentioned with Namuci, we may doubtfully take it to represent some form of mist or fog hanging over the bank of a river or the slope of a mountain.

(21) *Rauhina.* This is mentioned once (II. 12. 12), where we are told that Indra destroyed with his bolt the *Rauhina*, rising up to the heaven. See Kalakanjas (p. 65).

(22) *Varāha.* The term occurs several times in the Rigveda. It has been used to mean a boar (VIII. 77. 10), and figuratively to qualify Rudra (I. 114. 5) referring no doubt to its ferocity and ugly appearance, and Viśvarūpa (X. 99. 6). We are again told (I. 61. 7) that Indra cleaved *varāha*. It has also been used to qualify Vṛtra (I. 121. 11). We are thus inclined to take it to represent 'cloud'.

(23) *Varci.* This is mentioned four times, always with Śambara, both of them being addressed as *Dāsas* (VI. 47. 21). *Varci* has also been called *Asura* (VII. 99. 5). We are told (VI. 47. 21) that *Varci* and *Śambara* were killed by Indra in a place, so high as to be inaccessible (by climbing). Indra also killed a hundred thousand sons (II. 14. 6) or warriors (VII. 99. 5) or five hundred thousand attendants of *Varci* (IV. 30. 15).

The word *varci* is derived from *varc*, to shine, to be bright. Hence we can take it to be some bright object. Reference to a place inaccessible by climbing (*udvraja*) leads us to the idea of the top of such mountains as are inaccessible. Further, the significance of the name as 'bright one' makes us think of 'sheets of ice' on the mountain tops appearing bright through reflection of the sun's rays.

(24) *Vala.* The term occurs about thirty times and has been used to mean 'strength, vigour, power' (some fifteen times) and to represent the demon killed by Indra. We are told that Indra killed *Vala* (I. 52. 5; III. 34. 10) and rescued the cows detained by *Vala* (II. 12. 3; II. 14. 3; X. 67. 6). Indra cleft the cave of *Vala* containing cows. *Vala* has been qualified as a mountain or mountain-like (*adri*) and a giver of benefit (*phaliga*); he was afraid of Indra's roaring (I. 62. 4). If the word 'phaliga' is meant for *Vala* (as we have taken here), then we are told (VIII. 32. 25) that Indra cleft the benefit-giver (*phaliga*) for water and made the rivers flow downwards. In another place (VI. 39. 2) we are told that Indra, desiring cows, broke the summit of *Vala* on the top of the mountains and subdued the Panis by his roars. Again we find (II. 11, 20) that Indra, accompanied by the Angiras turned round the cakra, as the sun does, and killed Vala. We are also informed of the slaying of Arbuda in the same verse. In another place (III. 45. 2) Indra again has been called a cleaver of *Vala*. We also find Bṛhaspati credited with the same feats; he killed *Vala*, the giver of benefit, with the aid of the good praising ones (IV. 50. 5); he caught hold of the cows of *Vala;* the sun and moon rose (in the heaven) due to this feat of Bṛhaspati (X. 68. 10).

Adri and *Vala* are synonymous with cloud according to Yāska (*Nirukta* 5. 21. 2). We find that Indra killed *Vala* on the top of the mountain and delivered the cows. We are inclined to take *Vala* to represent that type of cloud which instead of pouring down rain directly, gives rise to hailstorms, the hail subsequently melting into water. Such a type of cloud (*Enc. Brit.*, 14th ed., Vol. 5, p. 852), known as *cumulo-nimbus*, assumes the form of mountains or towers or anvils, 'from the base of which local showers of rain or of snow, occasionally of hail or soft hail, usually fall'. We can easily explain the significance of *sānu* (top, summit of a mountain) and *adri*, if we accept this view. The term *phaliga* is appropriately used for *Vala*, as the water ultimately formed is of great importance for the production of crops. The cows may be appropriately taken for the hail which gives rise to water by melting.

(25) *Vṛtra.* The word occurs many times. First, he has been called *Dānu* (II. 11. 18) and his mother is also mentioned (I. 32. 9). Five times (I. 32. 5, 8, 11; I. 51. 4; I. 80. 10) he has been designated (or qualified) as *ahi*, a serpent. He has also been mentioned as Indra's enemy. In Śatapatha Brāhmaṇa (I. 6. 4. 18) *Vṛtra* was identified with the moon, Secondly,

we know something of his bodily features. Thus he is said to be without hands and legs (I. 32. 7) and again with these same members of the body (III. 30. 8). He has a head (I. 52. 10), mouth (I. 52. 15), a pair of jaws (I. 52. 6 ; I. 80. 5 ; X. 152. 3), joints of the body (I. 11, 12) and sixteen coils of the body (Taittirīya Saṃhitā, II. 1. 4). Thirdly, we are informed of other characteristics. He is capable of growing (III. 30. 8), is lustreless or dull (III. 32. 6), remains in a lying posture (III. 30. 20 ; IV. 19. 3) in the sky (I. 52. 6), extends all round the sky without limit (I. 52. 6), extends both to the heaven and earth (I. 80. 4), binds the earth and heaven together (I. 52. 10), is surrounded by darkness (X. 113. 6), is not stationary, that is, is always moving (I. 32. 10) and is restless (I. 32. 10). He has a weapon (I. 80. 10). He is again the obstructor of water (I. 52. 6 ; X. 113. 6), coverer of water (II. 14. 2 ; III. 32. 6 ; V. 30. 6), absorber of water (I. 31. 19) and obstructor of rivers (I. 52. 2). We are also informed of his trembling (I. 80. 12 ; VIII. 6. 6) and roaring (I. 30. 12 ; III. 30. 8). Fourthly, we come to consider the conflict between *Vṛtra* and several deities. We are told that Indra killed *Vṛtra* (I. 103. 8 ; III. 32. 6 ; IV. 28. 1 ; V. 29. 3 ; etc.) by cutting off his arm ; and *vṛtra* fell down on the earth like the trunk of a tree cut off with an axe ((kuṭhāra) (I. 32. 5) ; he struck at the mouth of *Vṛtra* (I. 52. 15) ; he struck at his shoulder (I. 32. 7), and *Vṛtra*, who held the water during his lifetime, now lay at its feet (I. 32. 8) ; he cut *Vṛtra* into pieces at the joints (VIII. 6. 13) ; he struck at the two jaws of *Vṛtra* (I. 52. 6 ; I. 80. 5), cut off his head (I. 52. 10), cleft his vital parts (I. 61. 6 ; VIII. 100. 7) and divided the joints by his bolt (I. 61. 12). Indra killed *Vṛtra* with the help of the Maruts (III. 47. 3 ; VIII. 2, 36 ; VIII. 76. 2) ; he came to know the vital parts of *Vṛtra* by being sent by the Maruts (III. 32. 4). Again we are told (VIII. 7. 23) that the powerful, kingless and rain-giving Maruts killed *Vṛtra*, huge like a mountain, by cutting it into pieces at the joints. Again we are informed that Indra delivered water after killing *Vṛtra* (I. 85. 9 ; V. 29. 2 ; etc.). We further see that Indra has been praised for having removed the cover of the waters, for having got hold of the wealth of the *Dānus* on the mountain and for having made the sun ascend the sky and thus made him visible to us after killing *Vṛtra* (I. 51. 4). We are further told (I. 80. 13) that, when Indra struck *Vṛtra* and his weapon with his bolt and he was determined to kill him, his strength spread all round in the sky and he displayed his supremacy. The Dāsa's wives, protected by *Ahi*, were confined ; the gate for (allowing) the flow of water remained closed. Indra opened the gate after having killed *Vṛtra* (I. 32. 11). Again, we find that Trita, strengthened by food, killed *Vṛtra* by cutting into his joints (I. 187. 1). We also see that Soma killed *Vṛtra* (IX. 61. 20). Lastly, we are told (I. 32. 9) that *Vṛtra's* mother remained looking downwards and Indra struck at her lower portion ; then the mother remained above and the son, *Dānu*, below, like a cow with her calf.

We have reference to *Vṛtra* in later Vedic literature. In Taittirīya Saṃhitā (I. 2. 1) Soma has been called the pupil of Vṛtra's eye ; we are also told that Indra killed *Vṛtra* with the help of Soma and Agni (I. 6. 11). In Śatapatha Brāhmaṇa (3. 1. 3. 12) we are told that, when Indra killed *Vṛtra*, his eyes made the mountain three-peaked. We find the same legend in the Atharvaveda (IV. 10. 1).

In Nirukta, both *Ahi* and *Vṛtra* are mentioned as synonyms of the cloud (2. 21. 2). *Ahi* is again a synonym of water (2. 42. 2) and *Vṛtra* of wealth (3. 9. 9).

Ahi and *Vṛtra* have been taken as synonymous in *five* passages already referred to above and in Nirukta. But, in spite of the common traits assigned to them in a few other places, we find many differences in their physical features in passages devoted to them individually. Thus, both of them are roarers, obstructive to water, and remain in a lying posture ; Indra killed both of them and made the waters run. Again, *Ahi* lives in a cave, remains concealed, is incapable of being seen and is a terror of the sky and heaven ; whereas, *Vṛtra* extends all round the sky, both to the heaven and earth without limit, is never stationary and is restless. *Ahi* causes the appearance of lightning and roaring of the cloud, but nothing is said of *Vṛtra*. Indra drove Ahi from the earth, but nothing of this kind is known of *Vṛtra*. Further, there is a difference of opinion regarding the physical characteristics of *Vṛtra* itself ; at one place he is called limbless, but at another place he is said to be possessed of limbs which are cut off by Indra. Taking all these facts into serious consideration I am inclined to the idea that *Ahi* and *Vṛtra* were originally different demons —representatives of different physical phenomena, but later were used to represent the same, perhaps owing to confusion of the ideas of the later Vedic sages regarding their physical features. We are still capable of indicating their differences. Thus, *Ahi* was the serpent of the sky ; he was a terror of the sky and heaven, and he was killed by Trita. Considering these and many other features that we have already discussed under *Ahi*, I conclude that it originally represented the constellation figure of *Hydra*. All the attributes of *Ahi* can be well explained if we take this constellation to rise above the horizon at the time of summer solstice, the period of rains. Plunket (*Ancient Calenders and Constellations*, pp. 117–9) has already shown that *Vṛtra* represents the constellation, *Hydra*, and that the summer solstice was above its middle and that the equator was passing through the coiled body of the snake-like constellation at about 4000 B.C. I take *Ahi* to represent this constellation. Considering the principal physical features of *Vṛtra* (sometimes repeated several times), I agree with the idea of the oriental scholars and take it represent the cloud. We can, more specifically, take it to represent that form of cloud which is known as *Nimbus* or raincloud (*Enc. Brit.*, 14th ed., Vol. 5, p. 852). 'If there are any openings in the cloud an upper layer of cino-stratus or alto-stratus may almost invariably be seen through them.' We may take these latter to represent *Vṛtra's* mother (I. 32. 9).

We may now interpret, so far as it is possible, some of the passages in connection with *Vṛtra*. Agru's son, in the anthill (see under Ahi) seems to be the larva of the white ant coming out of the egg, with a segmented body. The term *agru* means single and we cannot definitely say whether the Vedic sages knew that the eggs are laid parthenogenetically by female white ants. The moon has been called the pupil of Vṛtra's eye. This probably refers to the rent formed in the cloud through which the moon could be seen. The making of a three-peaked mountain by the eye of the *Vṛtra* probably also refers to a large ragged gap on the mountain top so as to make it appear as three-peaked.

(26) *Vṛṣaśipra*. In one place (VII. 99. 4) we are told that Indra and Viṣṇu destroyed the trick (māyā) of *Vṛṣaśipra*. The term can be derived from *Vṛṣa,* bull, and *śipra*, snout (*Nirukta* 6. 17. 2), thus signifying one with a snout like that of a bull. If we take into account the black colour of the snout, we may extend the meaning to 'one black like the snout of a bull'. In such a case we may think that *Vṛṣaśipra* represents a 'dark cloud'.

(27) *Śambara*. The name occurs some twenty-two times. He has been called *dāsa* (IV. 30. 14 ; VI. 26. 5 ; VI. 47. 21) and the son of Kulitara (IV. 30. 14). We are told that Indra killed Śambara (I. 51. 6 ; I. 54. 4 ; I. 101. 2 ; VI. 18. 8) for the benefit of Divodāsa (I. 130. 7 ; V. 19. 6 ; VI. 21. 5 ; VI. 43. 1). Indra destroyed the dwelling-places of *Śambara* (I. 103. 8) which were ninety-nine in number (II. 19. 6 ; IV. 26. 3 ; VI. 47. 2) or 100 in number (II. 14. 6) ; he did so with the help of Viṣṇu (VII. 99. 5). The dwelling places of Śambara were difficult to destroy (VI. 31. 4). There are some peculiarities in the conflict between Indra and *Śambara*. Indra killed *Śambara* in high mountains (VI. 26. 5 ; VII. 18, 20) with the face directed downwards (IV. 30. 14) and in high altitudes (*udvraja* region—so high as to be inaccessible by climbing) (VI. 47. 21) and threw him down from the mountain (I. 130. 7). In one place (II. 12. 11) we are told that Indra searched for *Śambara*, who was hiding in mountain, for forty years and at last got hold of him. We also find that Bṛhaspati killed *Śambara*, made the fixed (motionless) water flow and entered the mountain full of harvest (II. 24. 2). We also find that Vaiśvānara Fire destroyed *Śambara* and made the water flow downwards (I. 59. 6). We are further told that *Śambara* was killed by Indra for the benefit

of Divodāsa (I. 130. 7; II. 19. 6; VI. 21. 5; VI. 43. 1), who was rescued by Indra from being drowned in water (I. 112. 18). Soma also placed *Śambara* under Divodāsa's control in one day (IX. 61. 2).

According to Naighantu, Śambara means a cloud (1. 10) and power, strength (2, 9).

Comparing the conflicts of Indra with *Varci* and *Śambara*, we find that both of them were killed in a place so high as to be inaccessible by climbing and that a large number of their followers were killed by Indra. Whereas nothing further is said of *Varci*, *Śambara* is said to have been killed on high mountains with his head directed downwards and to have been thrown down from the mountain. As he was killed, fixed (motionless) water was made to flow. Agni is also said to have killed *Śambara* and to have made the waters flow downwards. Thus, having taken *Varci* to represent sheets of ice on the mountain top becoming bright through the reflection of the sun's rays, we are inclined to take *Śambara* to represent large masses of ice on mountains at a lower level. Whereas *Varchi's* destruction did not lead to any memorable event, *Śambara's* destruction led to some events described by the sages. Stripped of their allegoric coloration, they consisted principally of the melting of ice on the mountains by the sun's heat of the summer and the flowing of water down the mountains, with sheets of ice floating in it. The dwelling places of *Śambara* were thus the ice-clad top and sides of the mountains. Thus we find that *Varci* represents sheets of ice on the top of the higher mountains above the snow line, slightly melted by the sun's heat and that *Śambara* is the representative of large sheets of ice below the snow line which becomes melted in the summer and produces large currents of water (with ice sheets floating in them) flowing down the sides of the mountains. The finding of *Śambara* after forty years' search probably refers to a particularly cold winter (with the formation of much ice on the mountain) and followed by an intensely hot summer (with melting of ice and production of large currents of water flowing down the mountains)—an event quite unusual and not known to have occurred during the previous forty years. That there was a great flood is also indicated when we are told that the king Divodāsa (during whose reign this event took place) narrowly escaped death from drowning.

(28) *Śuṣṇa*. The name occurs some thirty-eight times. First, we find a number of attributes of Śuṣṇa. He is defying (I. 54. 5), roarer (I. 54. 5), devouring (that is, devourer of moisture) (II. 14. 5; II. 19. 6), destroyer (VIII. 6. 14), giver of unhappiness (IV. 16. 12), approacher of darkness (V. 32. 4), well-grown (V. 32. 4), preserver of cloud (V. 32. 4) and producer of heat (?) (V. 32. 4). He is trickful (V. 32. 4). He is attended with followers (I. 54. 5) and is a dweller among men

(*nārṣada*) (X. 61. 13). His dwelling place is moveable (VIII. 1. 28). He is hot-tempered (V. 32. 4). Secondly, we find Indra killing *Śuṣṇa*. Indra has been invoked to kill *Śuṣṇa* (I. 175. 4 ; X. 22. 7). Indra killed *Śuṣṇa* (III. 31. 8 ; IV. 16. 12 ; etc.) by his bolt (V. 32. 4 ; etc.). He cut the body of Śuṣṇa (VI. 26. 3 ; VIII. 40. 10 ; etc.). He hurt Śuṣṇa by going round the earth (X. 20. 4). He destroyed his dwelling place (I. 51. 11 ; IV. 30. 13 ; VIII. 1. 18) and his family (X. 22. 11), Indra removed the cap of *Śuṣṇa's* head (I. 54. 5) and destroyed his strength exhibited on the sky (I. 121. 10). Indra filled the wells with water (VIII. 51. 8) and made the water flow in streams (I. 51. 11) after he had killed Śuṣṇa. Lastly, we are told that he killed *Śuṣṇa* for the benefit of Kutsa (II. 19. 6 ; IV. 16. 12 ; VI. 20. 5).

In Nirukta (3, 9. 7) the term Śuṣṇa occurs as a synonym of strength. From the attributes of Śuṣṇa, there is no doubt that it represents 'drought', as already shown by oriental scholars.

We have another demon, *Anarśani*, which seems also to represent 'drought'. Comparing their attributes, we may consider *Anarśani* as representing a mild form of drought relieved by light showers and *Śuṣṇa* as a severe and long-continued form ending in heavy showers of rain.

Here we have reference of a long-continued severe drought during the time of Kutsa.

(29) *Sribinda*. The term occurs once (VIII. 32. 2) with *Anarśani*, *Pipru*, and *Ahīsuva*. Vedic scholars consider it and several others as 'a historical reminiscence of prominent terrestrial foes' (Macdonell's *Vedic Mythology*, p. 162).

We can, however, derive the word from *sri*, to flow, to cause to flow, and *binda*, from *bid*, to split up, thus signifying one which can be split up and made to flow. In such a case we may take it to represent a small rain cloud, clearing away after a local shower.

(30) *Svarbhānu*. The word occurs four times (V. 40. 5–9). He has been called an *āsura*. He covered the sun with darkness and Indra removed the trick (darkness) of *Svarbhānu*. Ahi put back the sun's eye (disk) on the sky (V. 40. 8). Ahi's sons released the sun from the darkness of *Svarbhānu*. We are also informed in the Brāhmanas (Gopatha, part 2, 3, 19; Tāṇḍya 4. 5. 2 ; Śatapatha 5. 3. 2. 2) that *Svarbhānu* covered the sun with darkness.

As is well-known, *Svarbhānu* is the shadow caused by the moon's disk in a solar eclipse. It corresponds to *Rāhu* of Pauranik literature. We have many references to solar eclipses in the Vedic and Brāhmanic literature. Perhaps the above hymn refers to a *total* eclipse.

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Śuṣṇa, 119.
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Sārameya, 63.
Sṛbinda, 120.
Smadita, 107.
Svarbhānu, 120.

Hemanta, 45.

ARTICLE No. 2.

Note on a Mauryan Inscription from Mahāsthān (the ancient Pauṇḍravardhana).

By D. R. BHANDARKAR.

This fragmentary but most interesting stone inscription in Mauryan Brāhmī was discovered on the 30th of November, 1931, by one Baru Faqīr of the Mahāsthāngarh village in the Bogra District of Bengal, not far from a mound which was being excavated by the Archæological Department.

The fragment, as it is, contains six lines of writing in Brāhmī alphabet of the Aśokan records. The language is the same as that of his Pillar Edicts, that is to say, it was the language of Madhyadeśa influenced by Māgadhī, or rather the Court language of Magadha. The purport of the inscription is briefly as follows: Some ruler of the Mauryan period, whose name is lost, had issued an order to the Mahāmātra, stationed at Puṇḍranagara, with a view to relieve the distress caused apparently by a famine to a people called Saṃvaṃgīyas who were settled in and about the town. Two measures were adopted to meet this contingency. The first apparently consisted of the advance of a loan in *gaṇḍaka* coins, and the second of the distribution of *dhānya* or paddy from the district granary. A wish is expressed that the Saṃvaṃgīyas will thus be able to tide over the calamity. With the restoration of plenty they were asked to return the coins to the Treasury and the corn to the granary.

It will be seen that this epigraphic record is of great historical importance. In the first place, it establishes the identity of the present Mahāsthān with the ancient Puṇḍranagara. The last line of the inscription clearly shows that it was fixed into the structure of a granary which could not have been far from the place where the stone plaque was found. The granary was thus situated in the present area of Mahāsthān. And as the granary originally belonged to Puṇḍranagara, there can be no doubt as to Mahāsthān being identical with Puṇḍranagara. Cunningham, with his topographical instincts, had long ago identified the two on the evidence of the Chinese pilgrim Yuan Chwang. His identification had, however, remained more or less uncertain for want of epigraphic evidence: but the find of our record now leaves no doubt on this point.

The second point of historical interest that we have to note is the manner in which the State in Ancient India endeavoured to combat the ravages of a famine. Mention is made in this inscription of the distribution of *dhānya* or unhusked rice. This paddy obviously must have been used as seed for sowing operations, and, also when husked, must have served the purpose of food. It may, however, be asked: why money was at all distributed among the Saṃvaṃgīyas? In this connection we have to remember that in East Bengal where nature is so plentiful, a famine can take place only through the inundation of a river. Mahāsthān, that is, Puṇḍranagara, is situated on a river, namely, the Karatoyā. And when a town is sited on a river, the floods cause devastation not simply to the crops in the fields but also to the buildings and huts which are situated on its bank. To meet this contingency, a money grant has to be made to the people whose belongings have been washed away or seriously affected by the floods. This is perhaps the only explanation that can be given of the disbursement of *gaṇḍaka* coins among the Saṃvaṃgīyas. What again we have to note here is that this disbursement of money and this distribution of unhusked rice were made to this people without any interest. If they had been charged with any, surely there would have been some reference to it in our record.

Perhaps ours is not the first known inscription which relates to the putting up of a granary as a protection against scarcity of food. Of practically the same period is an inscribed copperplate found at Sohagaura, about 14 miles south-east from Gorakhpur. A cursory glance at its contents will convince anybody that it refers not to one but to two granaries, and that this plate is an order to some Mahāmātra, stationed apparently at Śrāvastī, to open the two granaries and distribute their contents when any dire contingency called for it. In fact, the idea of counteracting the ravages of a famine by the erection of granaries and store-houses is pretty ancient in India, and it is not therefore a matter of surprise if the Mahāsthān inscription also adverts to the measures commonly employed by the State to combat the devastation caused by a famine in Ancient Bengal.

Let us now see what further light our record throws on the ancient history of Bengal. It is a pity that the first line of the inscription has not been preserved. The name of the ruler, if any was mentioned, is thus lost irretrievably. But as the alphabet and the language of our record are exactly like those of the Aśokan edicts, it is not impossible that he was a prince of the Mauryan dynasty. We have already seen that the language of this epigraph is the language of Madhyadeśa influenced by Māgadhī. It was really the language of the Mauryan Court in Magadha, which, owing to its growing imperialism, had spread not only over the whole of Madhyadeśa but also over parts conterminous to it. In fact, it had become the *lingua franca* of almost the whole of North India. We now see definitely that this *lingua franca* had spread even to Bengal and was in vogue there as early as the Third Century B.C. as our inscription conclusively proves. It is true that Brahmanism took a very long time to spread over Bengal. The Aryan culture seems to have been first disseminated in Ancient Bengal by the Jainas. It is curious to note that while Behar and Kośala were taken by Buddha and his adherents, Bengal was selected by Mahāvīra and his followers for their proselytizing activities. It is true that few traces of this original Jainism are now left in Bengal. But even as late as the middle of the seventh century A.D. the Chinese pilgrim Yuan Chwang testifies to the Nirgrantha Jainas being numerous in Puṇḍravardhana. Only the other day a copperplate charter was discovered during excavations at Paharpur, in Bengal, dated G.E. 159=478 A.D., which registers a grant for the worship of Arhats at a Vihāra situated not far from this place and presided over by the disciples of the Nirgrantha preceptor Guhanandin. No reasonable doubt can thus be entertained as to Jainism, and especially Nirgranthism, having been prevalent in Bengal up till the Seventh Century A.D. This may explain the employment of the Brāhmī alphabet in our inscription, but the use of the Court language of Pāṭaliputra is a clear indication of Bengal—at any rate North Bengal—being included in the Mauryan dominions.

The last point of historical interest that we have now to consider is: who were the Saṃvaṃgiyas—supposing that was the name really intended. Saṃvaṃgiyas in the first place remind us of Saṃvajjīs. We know that to the account of *Fu-li-chip* (=Vriji) by Yuan Chwang a note is added by the commentator, saying that '*Fu-li-chi* was in North India', and the north people called it the '*Sam-fa-chih* (or Samvajji) country'. On this point Beal makes the following pertinent comment: 'The country of the Vṛijjis or Saṃvṛijjis, i.e. united Vṛijjis, was that of the confederated eight tribes of the people called the Vṛijjis or Vajjis, one of which, viz. that of the Lichchhavis, dwelt at Vaiśālī.' Just as the eight confederate clans, of whom the Vajjis were the most important, were called collectively the Saṃvajjis, or the united Vajjis, it is not at all unreasonable to conjecture that there were similarly confederate clans in East Bengal who were similarly conglomerated under the collective term of Saṃvaṃgīyas. This shows that the most prominent of these at the beginning were the Vaṃgīyas, after whom the confederation was styled the Saṃvaṃgīyas or the united Vaṃgīyas. The second point to be noted here is that the people of East Bengal are now called Vaṅgas, and it may now be asked where was the necessity of coining from it a name which is an obvious derivative from it, namely, Vaṃgīya. If we now turn to the Vāyu and the Matsya Purāṇas and study the chapters dealing with *Bhuvana-vinyāsa*, we find that they mention the two allied clans, Pravaṅgas and Vaṅgeyas. But be it noted that none of them has been called Vaṅga. Furthermore, the second of these names comes so close to the Vaṃgīya of our inscription that our inscription, being earlier than any one of these Purāṇas and being a genuine record of the time, Vaṅgīya must doubtless be considered to be the original name and the reading Vaṅgeya of the Purāṇas thus becomes a corrupt form of it. Again, the fact that Pravaṅgas are coupled with Vaṅgīyas (wrongly called Vaṅgeyas) in these early Purāṇas shows that they were confederated clans and fell under the Saṃvaṃgīyas. And further, the reference to the Saṃvaṃgīyas in connection with Puṇḍranagara goes to indicate that the Puṇḍras also belonged to the Saṃvaṃgīya confederacy. And just as in the time of the Buddha the capital of the Saṃvajjī confederacy was Veśālī, which was the headquarters not of the Vajjis, but of the Lichchhavis who were then prominent, it seems that in the time of our inscription the capital of the Saṃvaṃgīyas was Puṇḍranagara, which was the headquarters, not of the Vaṅgīyas, but of the Puṇḍras after whom it was undoubtedly called Puṇḍranagara.

Note.—The text, with a facsimile of the inscription (which is now deposited in the Indian Museum, Calcutta), will be discussed at greater length in a paper which will shortly appear in the *Epigraphia Indica.*

ARTICLE No. 3.

Three Kushān Coins from North Bengal.

By N. G. MAJUMDAR.

I have received three gold coins for examination from Mr. H. E. Stapleton, Director of Public Instruction, Bengal. One of them comes from Maldah and the remaining two from Mahāsthān in Bogra District. The Maldah coin (No. 2) belongs to the cabinet of Mr. Stapleton, one of the Mahāsthān coins to that of the Rajshahi Museum (No. 1),[1] and the third piece (No. 3) has been recently acquired for the Indian Museum under the Treasure Trove Act. As Kushān coins are extremely rare in Bengal I welcome this opportunity, so kindly provided by Mr. Stapleton, of bringing these coins to the notice of scholars. The late Mr. Rakhal Das Banerji mentions in his *Bāṅglār Itihās*, Vol. I, Second Edition, pp. 38-39, practically all such finds reported before its publication. One of them, a gold coin of Vāsudeva, is said to have been discovered in the Bogra District[2] in 1909. This I think is identical with the coin (No. 1) in the Rajshahi Museum referred to above. The question has often been asked whether Bengal was included within the Kushān Empire; but unfortunately nothing has been found so far that can definitely settle this problem. It seems rather strange that not a single inscription of the Kushān Kings should come to light east of Benares, and we should have to be satisfied with the evidence of only a handful of coins collected from various parts of the Province.

No. 1 (Plate 1), which is a coin of Vāsudeva[3] (about 185 to 220 A.D.), bears on the obverse the profile figure of King standing with a trident in left hand and making an offering with right hand on an altar near which another trident is posted. He wears a peaked cap or helmet, a coat of mail and trousers, and a sword hangs down from his waist. The halo which is represented only in part by an arch is a regular feature of the portraits of Kushān Kings later than Kanishka. A symbol which looks like a Nandipada occurs below the king's left arm. The Greek legend along the edge of the coin reads—*Shaonano-Shao Bazọdeo Koshano*. The reverse bears the device of a two-armed Śiva standing by the side of his bull. He holds a trident in his left hand and a noose in his out-stretched right hand. He has also the halo as a sign of his godhead. Above his right arm there is a four-pronged symbol. To the left of the figure occurs in Greek *Oesho* which is taken to be the transliteration of a Sanskrit word denoting Śiva. There is a series of dots along the border of the coin. No. 2 is also a coin of Vāsudeva and of the same type as No. 1, but with this difference that the figure of the king as well as that of Śiva is made somewhat grotesque.

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[1] *Annual Report of the V.R. Society*, 1927-28 (No. 479).

[2] Chanda, *Gauḍarājamālā*, p. 4.

[3] Cf. Whitehead, *Catalogue of Coins in the Panjab Museum*, Vol. I, Pl. XIX, 209.

In the series of coins which bear the name of Vāsudeva in Greek on the obverse, two types[1] can be distinguished, of which one is evidently earlier and the other later. The earlier pieces are undoubtedly those on which the figures, royal and divine, are more or less carefully executed and the Greek legends are much less corrupt and still legible. Coming to the later group we find that the legends are written haphazardly, and in many cases quite corrupt and illegible; and the representations of kings and deities have become bizarre and grotesque. We should regard No. 1 of our coins as an example of the earlier type and No. 2 as approaching the later. It may be noted, however, that the debasement of technique on No. 2 has not yet reached that stage illustrated for instance by Gardner's *Catalogue of Coins*, Plate XXIX, Figs. 12-13 which are classed there as 'barbarous imitations'. The later issues of Vāsudeva and their imitations are a sort of link between the Kushān coins on the one hand and the Sassanian coins of the third and fourth centuries A.D. on the other.

Touching the imitations of Kushān coins, which seem to have been current in the period following the reign of Vāsudeva, we should now consider No. 3 of our coins. On a first glance it would appear to be an issue of Kanishka I with a type of whose coins (e.g. Cunningham, *Num. Chron.*, Series III, Vol. XII, Pl. VII, Nos. 9-10) it bears undoubted resemblance. Witness, for instance, the profile standing figure of the king on the obverse; he is bearded, wearing peaked cap, coat, trousers, and cloak, his left hand holding a spear and his right hand placed over an altar in the attitude of making offering. Witness also on the reverse: the profile figure of the goddess Nanaia standing, and in her front, the peculiar symbol which has four prongs with an arched curve below. All these details appear on the examples of the type of Kanishka's coins under reference. It is, however, in the Greek legends that we find the real difference. The legend on the obverse includes a number of letters which can be read, but they are so haphazard that nothing can be made out of them. At the back of the standing figure we can recognize an attempt to write *Koshano*, but it is impossible to read anything like *Shaonanoshao Kaneshki* which would complete the inscription, meaning 'Kanishka, the Kushān, King of Kings'. On the reverse of such coins we usually get the legend *Nanashao* consisting of seven Greek letters. In this case also the letters are no doubt seven and the legend occupies the same position as on the known issues of Kanishka of this type. But it can hardly be read as *Nanashao*. There is a demonstrable confusion between *N* and *H*, and the writer seems to have been labouring under an uncertainty about the form of Þ (*sha*). In these circumstances there cannot be any doubt that the coin is a copy anciently made of a certain class of Kanishka's coins. But it must have been issued when the Greek script was forgotten in India, or struck at a place where no artisan was available who knew the script and no attempt on his part to reproduce faithfully the original legend was thought necessary. As to when this coin might have been in circulation we cannot, of course, come to any definite conclusion. But judging from the fact that on coins such corrupt Greek legends came into vogue and were in profusion in the time of Vāsudeva and later, I am inclined to refer the coin to about the Third Century A.D., and it is not impossible that it was issued from some part of Eastern India. There is no other example of this specimen in the cabinet of the Indian Museum.

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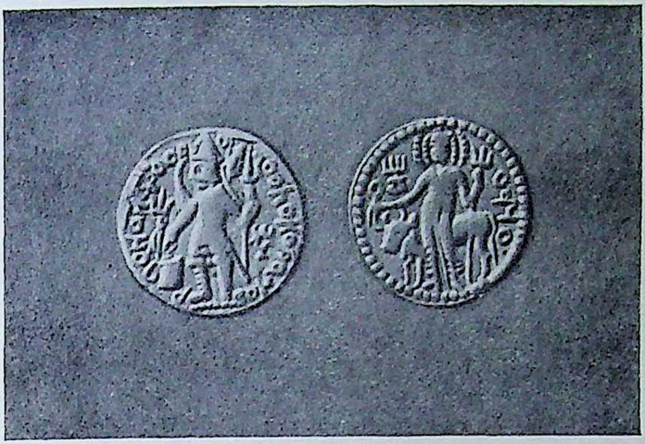
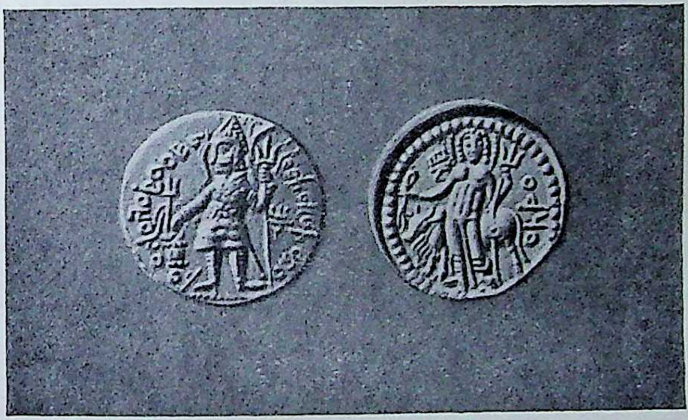
[1] Cf. *ibid.*, Vol. I, Pl. XIX, 209 and 211.

* * *

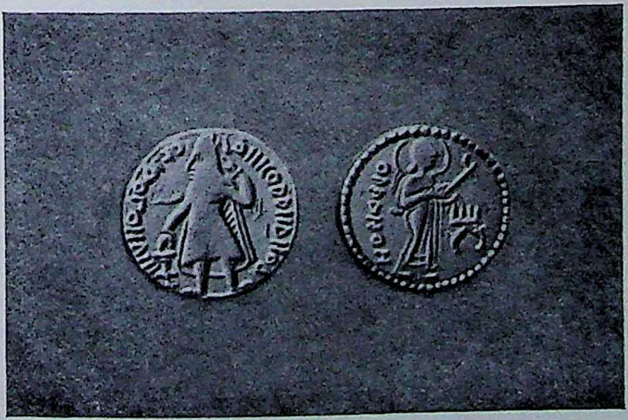
THREE GOLD KUSHĀN COINS FROM THE RĀJSHĀHĪ DIVISION, BENGAL.



No. 1. COIN OF VĀSUDEVA FROM MAHĀSTHĀN, BOGRA.



No. 2. COIN OF VĀSUDEVA FROM MĀLDAH.



No. 3. KUSHĀN COIN FROM MAHĀSTHĀN, BOGRA.

ARTICLE No. 4.

A 'Line of Time' for Northern Bengal.

[From the period of Gupta domination under Chandragupta Mauryya (*c.* 300 B.C.) to the Muhammadan conquest of Bengal (*c.* 1200 A.D.).]

By H. E. STAPLETON.

While editing the late Khān Sāhib Abid Alī Khān's 'Memoirs of Gaur and Pandua', I was greatly struck by the scarcity of definite information regarding historical events in Northern Bengal prior to the Muhammadan invasion under Ikhtiyāruddīn Muhammad bin Bakhtiyār Khaljī that brought the reign of the Sena Kings in every portion of Bengal except the Eastern Division of Banga to a close. Against the dim background of repeated invasion from outside and the strife of local Kings and Chieftains, almost the only periods of comparative peace were those indicated by the Khalimpur Copperplate Inscription of Dharmapāla—issued from Pāṭaliputra *c.* 800 A.D., by which land in the Province of Puṇḍravardhana (the modern Rajshahi Division) was granted to Brahmins; and by the Damodarpur Copperplates of Kumāragupta, Budhagupta, and Bhānu (?) Gupta (443–543 A.D.), which show a settled administration of Northern Bengal under the Gupta Emperors of Magadha.

Since the 'Memoirs' were edited, much further light has been thrown on the history of Bengal by (*a*) the discovery of the Mauryya inscription at Mahāsthān which is dealt with in Dr. Bhandarkar's paper as well as the Kushān and pseudo-Kushān coins that have been described in Mr. N. G. Majumdar's paper. I accordingly again took up the question in consultation with Messrs. N. K. Bhattasali (Curator of the Dacca Museum) and Sarasi Kumar Saraswati (Government Research Scholar, Rajshahi Museum), and now present the results of my enquiries in the annexed tentative 'Line of Time'. In this, as far as possible, all the archæological material that has a bearing on the history of Northern Bengal is summarized in tabular form as a basis for future historical work on the subject. It will be seen from this table that, with the exception of a gap in the period of about 250 years from the period of the Sungas to that of the Kushān King Vāsudeva, a reasonably complete picture of the history of Northern Bengal from 300 B.C. to 1200 A.D. is now available.

January 2nd, 1933.

NOTE.—The Line of Time was subsequently revised in the light of the discussion at the Society's meeting as well as further enquiries. It was resubmitted for publication on March 22nd, 1933.

'LINE OF TIME' FOR NORTH BENGAL
TO THE MUHAMMADAN CONQUEST

I Dates.	II Historical Facts.
(1) 313 B.C. ..	Accession of Chandragupta Mauryya at Pāṭaliputra.
(2) 185–73 B.C. ..	Sunga dynasty of Magadha.
(3) *c.* 120–160 A.D. ..	Kushān dynasty of Kanishka reigning from Peshāwar.
c. 160–185 A.D. ..	Huvishka, Kanishka's son.
c. 185–220 A.D. ..	Vāsudeva, the Hinduized Kushān successor of Huvishka.
(4) 319-320 A.D. ..	Gupta era begins in Northern India with the accession of Chandragupta I to the throne of Pāṭaliputra.

FROM THE ACCESSION OF CHANDRAGUPTA MAURYYA,
OF BENGAL (*i.e.*, *c.* 300 B.C. TO 1200 A.D.).

III

Archæological Material discovered in Northern Bengal and elsewhere which has a bearing on the history of Northern Bengal (with Bibliography).

(1) (*a*) Fragmentary Mauryya Inscription found at Mahāsthān (Bogra Dist.) in November, 1931, in which some ruler issued an order that, for the relief of distress caused apparently by famine to a people called Saṁvamgiyas, the Mahāmātra (officer) stationed at Puṇḍranagara should (i) make advances in money and (ii) distribute paddy from the district granary on which the inscription was placed. Dr. Bhandarkar in his paper (annexed) suggests that this is the first mention of the Bengalis as a confederation of tribes called Vaṁgiyas (a name still current in Eastern Bengal under the form Vaṅgas). The inscription also settles the identity of Mahāsthān with the historical Puṇḍravardhana.

(*b*) That Jainism was very prevalent in Puṇḍravardhana in the Mauryya period may be gleaned from a story in the *Divyāvadāna*, where it is said that on the report that in the city of Puṇḍravardhana, the effigy of Buddha is painted as falling at the feet of Nirgrantha by the Nirgrantha (Jaina) worshippers, King Aśoka ordered the slaughter of all Ājīvakas (Jains) there and that 1,800 Ājīvakas were slain in one day (*vide Divyāvadāna*, edited by Cowell and Neill, p. 427).[1]

(2) Terra-cotta plaque of the Sunga period (2nd century B.C.) found at Mahāsthān in 1928-29 : now in the Indian Museum.[2]

(3) (*a*) and (*b*) Two gold coins of the Kushān King Vāsudeva, one from Mahāsthān (now in the collection of the V.R. Society, Rajshahi—V.R. Society, Ann. Rep., 1927-28), and one said to have been found at Māldah in 1888 (now in Mr. H. E. Stapleton's cabinet).

(*c*) A gold pseudo-Kushān coin (modelled on those of Kanishka) found at Mahāsthān in May, 1932, and now in the cabinet of the Indian Museum. This is possibly a local coin struck between the end of Vāsudeva's reign and the accession to power of the Guptas, *i.e.*, in the 100 years between 220 and 320 A.D.

A reproduction of these 3 coins will be found in the Plate illustrating Mr. N. G. Majumdar's paper (annexed).

(4) The Allāhābād Pillar Inscription of Samudragupta (Fleet, *Corpus Inscriptionum Indicarum*, Vol. III, No. 1) mentions Samataṭa, Ḍavāka, Kāmarupa, and Nepāla as frontier kingdoms of Samudragupta's empire.

Samataṭa, according to N. K. Bhattasali ('Some image inscriptions from East Bengal', *Ep. Ind.*, Vol. XVII, p. 353), is the area of plain including Tippera which was bounded on the North by the Gāro and Khāsiā Hills, on the West by the old course of the Brahmaputra (through Mymensingh), and on the South by the Bay of Bengal. The next country on the list before Kāmarupa (which was certainly Assam) is Ḍavāka and may be identified with the northern portion of the modern district of Dacca, South-Western Mymensingh, and possibly the modern district of Rangpur.

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[1] *Vide* also Note (1) on p. 145.

[2] *Vide* also Note (2) on p. 145.

'LINE OF TIME' FOR NORTH BENGAL
TO THE MUHAMMADAN CONQUEST

I Dates.	II Historical Facts.
(5) c. 380–415 A.D. . .	Chandragupta II (Vikramāditya), son of Samudragupta.
(6) c. 415–455 A.D. . .	Kumāragupta I (Mahendrāditya), son of Chandragupta II.
(7) 447–543 A.D. . .	Gupta rule in North Bengal appears to have continued, but a gradual diminution of their authority may be inferred from the Governors taking upon themselves the title of Mahārājās.
(8) 543–c. 590 A.D. . .	The Maukhari prominence in North India who, in their career of expansion, came into conflict with the rising power of the

FROM THE ACCESSION OF CHANDRAGUPTA MAURYYA, OF BENGAL (*i.e.*, *c.* 300 B.C. TO 1200 A.D.).

III

Archæological Material discovered in Northern Bengal and elsewhere which has a bearing on the history of Northern Bengal (with Bibliography).

Its probable boundaries were the Brahmaputra on the East and Karatoyā on the West. Nepāla still retains the name it bore nearly 1,600 years ago. In the light of the mention and location of these apparently still practically independent Kingdoms in North-Eastern India, it seems reasonable to conclude that the ancient province of Puṇḍravardhana had already been incorporated in the Gupta empire.

(5) (*a*) Three coins of Chandragupta II—'Śrīvikrama' (Archer) type—found in Bogra district and now in the collection of the Varendra Research Society, Rajshahi (*V.R. Society, Ann. Rep.*, 1927-28).
(*b*) Another coin of the same type found 5 or 6 years ago on a mound near Patisar (Rajshahi) district and now with Babu Jogendra Nath Mandal of village Pālsā, 2 miles distant (information supplied by S. K. Saraswati).
(*c*) The image of Buddha of the Gupta period from Beharail (Rajshahi Dist.), now in the collection of the V.R. Society, Rajshahi.

(6) (*a*) The Dhanaidaha (Rajshahi Dist.) Copperplate of Kumāragupta of the year 113 G.E. (432-433 A.D.) registering a sale of land in Khāṭāpārā *viṣaya*,—situated presumably in the Puṇḍravardhana *bhukti*. (*Vide Ep. Ind.*, Vol. XVII, pp. 345 ff.)
(*b*) The Damodarpur (Dinājpur Dist.) Copperplates of Kumāragupta of 124 and 128 G.E. (443-444 A.D. and 447-448 A.D. respectively) registering sales of lands in the Koṭīvarṣa *viṣaya* of the Puṇḍravardhana *bhukti*. (*Vide Ep. Ind.*, Vol. XV, pp. 113 ff.)
(*c*) The newly discovered Baigrām (Hili, Bogra Dist.) Copperplate, dated 128 G.E. (447-448 A.D.)—about to be published in *Ep. Ind.* by Dr. R. G. Basak.

These plates show that regular administrative machinery was then working in North Bengal under Governors (*Uparikas*) appointed by the Gupta Emperor. The Governors in their turn appointed District Officials (*Viṣayapatis*) who were assisted in the local administration by a council of four members.

(7) (*a*) The Paharpur Copperplate grant of the Gupta year 159=479 A.D., registering the purchase of fallow state land by a private individual for gift to the Jain Vihāra at Vata-Gohāli presided over by the Jain preceptor Guhanandin. (K. N. Dikshit, *Ep. Ind.*, Vol. XX, pp. 59–64 and plate.)
(*b*) The Damodarpur Copperplates Nos. 3, 4, and 5 recording purchases of fallow state lands in the Puṇḍravardhana *bhukti*, the last of which is dated in 224 G.E.=543 A.D. (R. G. Basak, *Ep. Ind.*, Vol. XV, pp. 113 ff.)

(8) The Haraha Inscription of the reign of Īśāṇavarmman (*Vikrama Samvat* 611=554 A.D.; *vide Ep. Ind.*, Vol. XIV, p. 110) says that Īśāṇavarmman compelled the Gauḍas, strong on the sea, to remain within their proper limits. The statement gives rise to two

I Dates.	II Historical Facts.
	Gauḍas, also following a similar course, but the latter were ultimately checked by Īśāṇavarmman, the Maukhari King.
(9) c. 590–c. 620 A.D. ..	Saśāṅka of Karṇasuvarṇṇa (Now Kānṣonā, *alias* Rangamati, on the western bank of the Bhagirathi, about 7 miles south-west of Berhampur) becomes supreme ruler in Bengal (*cf.* 'Gauḍādhipa', the epithet of Śaśāṅka in the *Harṣacharita* of Bāṇabhaṭṭa).
	Campaign of Harṣa against Śaśāṅka which does not seem to have been very successful (at least while Śaśāṅka was alive).
c. 619–637 A.D. ..	After the death of Śaśāṅka, the power of Bengal was broken by a combination of Harṣa and his eastern ally Bhāskaravarmman of Kāmarupa, who is said to have had his camp of victory pitched at Karṇasuvarṇa. This, however, seems to have been a temporary occupation, though it may have led to the disruption of Śaśāṅka's empire and the division of Bengal among several smaller chieftains.
(10) 637 A.D. ..	Hiuen Tsang visits Bengal—then divided into six states.

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presumptions—first that by 554 A.D. Gauḍa was an independent power; secondly, that the Gauḍas had not only become independent but were trying to overstep their natural frontiers. Three Kings of Bengal, who must be ascribed to this period on palæographical grounds, are known, *viz.* Dharmāditya, Gopachandra, and Samāchāra. They are all styled Mahārājādhirājas in their Faridpur plates (*Indian Antiquary*, 1910, p. 216, and *Ep. Ind.*, Vol. XVIII, p. 74 ff.). Except for two coins of Samāchāra from the same neighbourhood, these Kings are only known through the discovery of their Copperplate grants.

(9) (*a*) *Mañjuśrīmūlakalpa*, 53rd *Paṭalavistāra* (New reference supplied by Prof. Radhagobinda Basak in his paper on 'Śaśāṅka, King of Bengal'; *I.H.Q.*, Vol. VII, pp. 1 ff.).

(*b*) In the campaign, Harṣa is said to have reached the town of Puṇḍra where he caused great havoc, but from the way in which the author of the *Mañjuśrīmūlakalpa* sums up the results of the war (*Ibid.*, p. 14), they do not seem to have been very satisfactory for Harṣa. Evidently only a temporary victory was obtained. The Ganjam Plates of Mahāsāmanta Mādhavavarman (*Ep. Ind.*, Vol. VI, p. 143), mentioning Śaśāṅka as his suzerain as late as 619 A.D., supports this suggestion.

(*c*) The Nidhanpur (Sylhet) plate of Bhāskaravarman (*Kāmarupa śāsanāvalī* by MM. Padmanath Bhattacharyya, pp. 1–43).

(10) In his time *Pun-na fa-tan-na* (Puṇḍravardhana, *i.e.*, North Bengal), which was more than 4000 *li* (*c.* 800 miles) in circuit and its capital more than 30 *li* in circumference, had a flourishing population, and was well provided with tanks, hospices, and flowery groves. Jack-fruits were available in plenty. Besides the Buddhists following the Great and Little Vehicles, and the Brahmanas, there lived in North Bengal many Digamvara Nirgranthas (Jains). Belief in oracles was current. (Watters on Yuanchwang, Vol. II, p. 184.)

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I Dates.	II Historical Facts.
(11) c. 650–750 A.D. ..	Bengal under local kings who struck coins modelled on those of the Guptas and of Śaśāṅka. Beginning of the period of confusion : but continuance of the revival of Hinduism.
(12) c. 700 A.D. ..	The King of Puṇḍra, who is described even by his enemies as skilful in destroying his enemies, was killed by a chief of the Śaila family who usurped the kingdom and established his family there.
(13) c. 720 A.D. ..	Gauḍa, which, in all probability, was under Kings of the Śaila family and not under Jīvitagupta II as is generally held, was invaded by Yaśovarmman of Kanauj.
(14) c. 740 A.D. ..	Lalitāditya Muktāpīḍa, King of Kashmir, defeats and kills Yaśovarmman and in his triumphal progress towards the Eastern ocean most probably conquered Gauḍa. He invited the King of Gauḍa to Kashmir where he was murdered. The followers of the Gauḍa King travelled to Kashmir to avenge the murder.
(15) c. 750 A.D. ..	Gauḍa occupied by Harṣadeva of Kāmarupa.
(16) c. 750 A.D. ..	The Kashmir King, Jayāpīḍa, visits Puṇḍravardhana, marries Kalyāṇadevī the daughter of Jayanta, the King of Gauḍa, and, after defeating five other chiefs of Gauḍa, made his father-in-law supreme in Bengal.
(17) c. 765 A.D. ..	Gopāla, elected King of Bengal by the people themselves to end the prevalent anarchy. The dynasty he established, which was known as the Pāla dynasty, continued to rule Bengal, though with

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(11) (*a*) 'Attribution of imitation Gupta coins' (N. K. Bhattasali, *J.P.A.S.B.*, 1925, P. N. 1 ff.).
(*b*) Paharpur reliefs of this period show many Hindu gods in which scenes from the life of Kṛishṇa (including a relief of Gopī and Kṛishṇa) predominate.
(*c*) Vishṇu image in the Rajshahi Museum ascribed by Dr. Kramrisch to 7th-8th century A.D. (Fig. 2, Pl. II, Pāla and Sena Sculpture, *Rupam*, No. 40).

(12) The Ragholi (Central Provinces) plates of Jayavarddhana (*Ep. Ind.*, Vol. IX, pp. 41 ff.).

(13) (*a*) *Gauḍavaho* of Vākpatirāja, Ed. by S. P. Pandit (Bombay Sanskrit Series, No. 34).
(*b*) 'Kanauj and Yaśovarmman', V. A. Smith (*J.R.A.S.*, 1908, pp. 765 ff.).

(14) Kalhaṇa's *Rājataraṅginī* (Stein's translation, Vol. I, pp. 132-3 and 152-3).

(15) Paśupati Inscription of Jayadeva, King of Nepal, dated 153 H.E. (759 A.D., *Ind. Ant.*, Vol. IX, p. 178). Jayadeva married Rājyamatī, daughter of Harṣadeva of the Bhagadatta dynasty of Kāmarupa, who is styled in the inscription as Lord of Gauḍa, Oḍra, Kalinga, and Kośala.

(16) Kalhaṇa's *Rājataraṅginī* (Stein's translation, Vol. I, pp. 160-3).

(17) (*a*) *Ind. Ant.*, Vol. IV, pp. 365-366.
(*b*) Copperplate Inscription of the 32nd year of Dharmapāla found at Khalimpur *alias* Kholi Alampur, 6 miles east of Gaur, verse 4 (*Ep. Ind.*, Vol. IV, p. 243).

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I Dates.	II Historical Facts.
	various vicissitudes of fortune, for about four centuries. Buddhism was the religion of the ruling family, but Hinduism continued to progress.
(18) c. 775–810 A.D. ..	Dharmapāla, son and successor of Gopāla, had a triangular contest with the Gurjaras (Vatsarāja and Nāgabhaṭa) and the Rāshṭrakūṭas (Dhruva and Govinda III) for the supremacy of Northern India, in the end of which he appears to have been successful, as in all the Pāla records he is uniformly described as the paramount sovereign of Northern India.
(19) c. 810–850 A.D. ..	Devapāla, son and successor of Dharmapāla, maintained his supreme position in Northern India.
(20) c. 850–970 A.D. ..	Vigrahapāla I (Surapāla I), Narāyanapāla, Rajyapāla, Gopāla II, Vigrahapāla II. Gradual decline of the Pāla power in Northern India, before the eastward expansion of the Pratihāras under Bhoja and Mahendrapāla. Indeed, the political power of the Bengal Pālas sank so low that, about the beginning of the 10th century A.D., they may for a time have been ousted from their homeland, Varendrī, by Mahendrapāla.
(21) c. 970–980 A.D. ..	Occupation of North Bengal by Kāmbojas, who probably ousted Vigrahapāla II.
(22) c. 985 A.D. ..	Mahīpāla I, son of Vigrahapāla II, recovers North Bengal.

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(18) (*a*) The above-mentioned Khalimpur Inscription of Dharmapāla, issued from Pāṭaliputra but granting villages in Puṇḍravardhana *bhukti*.
- (*b*) Seal of the community of monks at the monastery of Somapura founded by Dharmapāla, discovered at Paharpur in 1926-27 (*A.S.I., A.R.*, pp. 149 and 199).
- (*c*) Baroda grant of Karkarāja (*Ind. Ant.*, Vol. XII, p 160).
- (*d*) Wani grant—(*Ind. Ant.*, Vol. XI, p. 157).
- (*e*) Gwalior Inscription of Bhoja (*A.S.I., A.R.*, 1903-04, pp. 280-81).
- (*f*) Unpublished Copperplate of Amoghavarṣa by D. R. Bhandarkar (*Ep. Ind.*, Vol. IX, p. 26, note 4; *J.B.R.A.S.* Vol. XXII, p. 118).
- (*g*) R. C. Majumdar, 'Pāla Chronology' (*J.P.A.S.B.* 1921, pp. 1 ff.).

(19) Consideration of the Nālanda Copperplate of Devapāla deva, year 39 (*Vide* N. G. Majumdar, *V.R.S. Monographs* No. 1) necessitates the pushing back of Dr. R. C. Majumdar's chronology by a further five years.

(20) (*a*) Badal (Dinājpur) Pillar Inscription of Bhaṭṭa Gurava Miśra, the Minister of Nārāyaṇapāla (A. K. Maitra, *Gauḍalekhamālā*, pp. 70–85).
- (*b*) The Paharpur (Rajshahi) Pillar Inscription of the year 5 of Mahendrapāla (*c.* 900 A.D.; *A.S.I.A.R.*, 1925-26, p. 141).
- (*c*) Miniature inscribed image of Jambhala from Paharpur (now in the Indian Museum), 10th century A.D.

(21) The Dinājpur Pillar Inscription (*J.A.S.B.*, Vol. VII, p. 619), records the erection of a temple at Devīkoṭ by a King of Kāmboja extraction. Mr. R. P. Chanda takes the word 'Kuñjaraghaṭāvarṣa' of the inscription as the date 888 Sāka. Dr. R. C. Majumdar is inclined to take it as an epithet (*viruda*) of this Gauḍapati of Kāmboja extraction, and suggests that he may be identified with Sāhilladeva, King of Chamba, who acquired the epithet 'Karivarṣa' by destroying herds of elephants of the enemy at Kurukhṣetra. (*Vaṅgavānī* of *Chaitra*, 1330 B.S., pp. 249–52.)

(22) (*a*) The Bangarh (Dinājpur) Copperplate grant of Mahīpāla, year 9. (A. K. Maitreya, *Gauḍalekhamālā*, pp. 91–100.)
- (*b*) Mahīpāla dighi, 18 miles to the S.-W. of Dinājpur.

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I Dates.	II Historical Facts.
(23) c. 1026–1070 A.D. ..	Nayapāla ; Vigrahapāla III ; Mahīpāla II.
(24) c. 1070 A.D. ..	Kaivartta revolt, and the temporary eclipse of the Pāla power in North Bengal.
(25) c. 1077 A.D. ..	Rāmapāla, youngest brother of Mahīpāla II, defeats and kills Bhīma, the Kaivartta King and recovers North Bengal. Foundation of Rāmāvatī, the new Pāla capital, on the present site of Gaur. Assam conquered (or invaded) by a feudatory of Rāmapāla.
(26) c. 1120 A.D. ..	Succession of Kumārapāla, who reconquered Assam.
(27) c. 1125 A.D. ..	Gopāla III, son of Kumārapāla.
(28) c. 1130 A.D. ..	Madanapāla, youngest son of Rāmapāla, succeeds Gopāla III.
(29) c. 1140 A.D. ..	North Bengal passed into the hands of the Senas under Vijayasena, who had already wrested Rāḍha and Mithilā from the Pālas, and who drove away the King of Gauḍa (evidently Madanapāla). The latter took shelter in Magadha where he reigned for a few years more.
(30) c. 1165–1178 A.D. ..	Vallālasena, son of Vijayasena.
(31) c. 1178–1208 A.D. ..	Lakṣmaṇasena, son of Vallālasena.

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(23) The Āmgachi (Dinājpur) Copperplate grant of Vigrahapāla III (A. K. Maitreya, *Gauḍalekhamālā*, pp. 121–26), granting land in his 13th year in the village Brāhmanī, situated in the Koṭīvarṣa *viṣaya* of the Puṇḍravardhana *bhukti*.

(24) The Dhīvardighi pillar near Devīkoṭ (Dinājpur), though uninscribed, is connected by local tradition with the successful Kaivartta revolt under Bhīma in Varendra, which forms the subject matter of Sandhyākara Nandī's *Rāmacharitam* (A. K. Maitreya, 'The Stones of Varendra', reprinted from the *Modern Review*, 1912, September, p. 6).

(25) (*a*) *Rāmacharitam* of Sandhyākara Nandī, Edited by MM. Haraprasad Sastri (*M.A.S.B.*, Vol. III).
(*b*) The extensive embankment in the Bogra district, known as *Bhīmer jāngāl*, most probably represents the defensive work set up by Bhīma against the army of restoration under Rāmapāla.

(26) The Kamauli Plates of Vaidyadeva (A. K. Maitreya, *Gauḍalekhamālā*, pp. 127–146), Vaidyadeva was the Minister of Kumārapāla, and afterwards became King of Kāmarupa.

(27) The Rajshahi (Manda) Stone Inscription (now in the Indian Museum) of Gopāla III (R. D. Banerji, *M.A.S.B.*, Vol. V, p. 102).

(28) The Manahali (near Devīkoṭ, Dinājpur) Copperplate grant of Madanapāla, year 8, granting the village Kāṣṭhagiri situated in Koṭīvarṣa *viṣaya* in Puṇḍravardhana *bhukti* (A. K. Maitreya, *Gauḍalekhamālā*, pp. 147–58).

(29) The Rajshahi (Deopara) Inscription of Vijayasena (N. G. Majumdar, '*Inscriptions of Bengal*', Vol. III, pp. 42–56).

(30) Vallāl-bāṛī, the northern part of Gaur, probably was the twin palace and fortress of Vallālasena.

(31) (*a*) The Tarpaṇadighi (Dinājpur) Copperplate grant of Lakṣmaṇasena, year 3 (N. G. Majumdar, *op. cit.*, III, pp. 92–105), granting the village Belahishṭi in Varendrī within the Puṇḍravardhana *bhukti*.

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I Dates.	II Historical Facts.
(32) *c.* 1202 A.D. ..	Invasion of Ikẖtiyāruddīn Muḥammad bin Bakẖtiyār, who occupied North Bengal up to a line somewhere north of Devīkoṭ. He unsuccessfully invaded Assam in 1206 A.D. and died shortly afterwards.

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(*b*) The Mādhāinagar (Pabna) Copperplate grant of Lakṣhmaṇasena (N. G. Majumdar, *op. cit.*, pp. 106–115), granting the village Dāpanīyapāṭaka in Varendrī within the Puṇḍravardhana *bhukti*.

(*c*) The lost Bhowāl Copperplate (*Indian Historical Quarterly*, Vol. III, pp. 89–96) which appears to have been dated in the 27th year of Lakṣmaṇasena, closely resembles the draft of the Mādhāinagar plate (date lost) and not that of the Anulia, Tarpandighi, Govindapur, and the Jaynagar plates all dated in his early years. The *Mādhāinagar* plate thus seems to have been dated in his later years.

(*d*) For date of the accession of Lakṣhmaṇasena, cf. C. H. Chakravarty (*I.H.Q.*, Vol. III, pp. 186–189).

(32) (*a*) *Tabaqāt-i-Nāṣirī*, translated by Raverty (Vol. I, pp. 556–573).

(*b*) N. K. Bhattasali in his paper on the Determination of the Epoch of the *Parganāti* Era' gives *S'āka* 1124, *i.e.*, 1202 A.D. from which date the *Parganāti* or the *Vallāli* Era begins, as the date of the occupation of North Bengal by Muḥammad bin Bakhtiyār (*Ind. Ant.*, Vol. LII, 1923, pp. 314–320).

(*c*) The Rock inscription at Kanaibarshi to the north of Gauhati (MM. Padmanatha Bhattacharyya, *Kāmarupa S'āsanāvalī*, Introduction, p. 44), states that on the 13th *Chaitra* in the *S'āka* year 1127 (27th March, 1206 A.D.) the Turuṣkas, who had come to Kāmarupa, were utterly destroyed.

NOTES TO PAGE 133.

(1) For iconographic traces of Jainism in Northern Bengal, *vide* the annexed paper by S. K. Saraswati dealing with his Third Tour. In this two images are mentioned (*a*) one of the Sixteenth Tīrthaṅkara Śāntinātha from Mandoil, Dist. Rajshahi: (*b*) one of Ṛishabhanātha—the first of the 24 Jain Tīrthaṅkaras—discovered at Surohor on the opposite side of the Chirāmatī, Dist. Dinājpur, to the old site of Ekdālā. In each case miniatures of the remaining 23 Tīrthaṅkaras surround the main image. As these images date from the 11th-12th century A.D., they indicate the survival of Jainism in Northern Bengal for 1,400 years after the time of Asoka.

For other mentions of Jainism in this part of Bengal *vide supra*, para. 7(*a*)—Gupta times; and para. 10 (in the 7th century A.D. after the end of Śaśāṅka's reign).

(2) A plaque of probably the same period (2nd century B.C.), but representing a standing Yakshinī, was discovered by Prof. Suniti K. Chatterji at Pokharṇā (the ancient Pushkaraṇā) in the Bankura District in 1932, and exhibited at the A.S.B. meeting of March 6th, 1933.

ARTICLE No. 5.

Note on a seated and inscribed image of Sūryya from Qaṣbah (Ekdālā), District Dinājpur.

By N. CHAKRAVARTI *and* S. K. SARASWATI.

Next to the images of Vishṇu, those of Sūryya are the most numerous in Bengal. The form of the Sun-god, closely resembling that of Vishṇu in general appearance, may be said to be almost stereotyped, the god usually standing erect on a lotus with two attendants, a male and a female, on either side. Seated images of Sūryya are however very rare and, as such, a brief notice of the present image, a seated sample collected from Qaṣbah near Bairhāṭṭā (Ekdālā, Dinājpur) by Mr. H. E. Stapleton, Director of Public Instruction, Bengal, during a tour in 1930, and now presented by him to the Indian Museum, will not be superfluous.

The image is in a good state of preservation, except for the hands being broken off, the nose mutilated, and the upper part of the body of a figure in front of the god lost. Out of the *pañcharatha* pedestal, and dividing it into two sections, emerge the seven horses of Sūryya's car. Below the central horse there is a wheel indicating the one-wheeled chariot of Sūryya, and to the extreme right there are two human figures, a male and a female, probably the donor and his wife. Above the central horse *Aruṇa*, the thighless charioteer of Sūryya, sits on a *makara* clasping its trunk with the left hand while the right swings a whip. He is flanked on either side by *Uṣā*, and *Pratyuṣā*, shooting arrows to dispel darkness at the approach of the dawn. Behind *Aruṇa* sits in *arddhaparyaṅka* a figure, the upper part of which is unfortunately missing. The figure most probably represents the goddess *Mahāśvetā* who is enjoined to be placed just in front of the god.[1]

The god sits in *vajraparyaṅka* on a lotus, booted as in other Sūryya images, and wears a close-fitting garment fastened to the waist by an elaborate girdle from which hang on either side a sword and a dagger. He also wears a coat of mail—again a speciality with him [2]—as also the other usual ornaments, such as the necklace, the ear-rings, the bracelets, the armlets and a tapering crown (*Kirīṭamukuṭa*). He holds in his two hands

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[1] Cf. *Bhaviṣya-Purāṇa*, 130, 52.
Piṅgalo=dakṣiṇe pārśve vāmato=Daṇḍanāyakaḥ |
Srī Mahāśvetāyāḥ sthânaṁ puratas=tvaṁśumālinaḥ ||

[2] Cf. *Vishṇudharmottaram*, III, 67.
................*kavachen=ābhisaṁvṛtah* |

(both broken away), two lotuses—his usual attributes—which rise a little above his shoulders.

On his two sides appear his four attendants, all booted and seated in *arddhaparyaṅka*. To the extreme right there is a stout bearded male figure with pen and inkstand in his two hands. He is known as *Piṅgala*, *Agni*, or *Dhātā* (i.e., *Brahmā*) as he is variously called.[1] To the extreme left of the image there is another male figure with his right hand in *abhayamudrā* and the left resting on the thigh and holding a sword erect. He is uniformly styled as *Daṇḍa*, *Daṇḍī* or *Daṇḍanāyaka* (meaning *Skanda*, the general of the heaven) by all the authorities excepting the *Agnipurāṇa* which wrongly calls him *Piṅgala*.[2] The two female attendants with chowries on either side of the deity represent his two wives *Rājñī*, *Sureṇu* or *Dyau*, the daughter of *Viśvakarmā*; and *Chhāyā*, *Nikshubhā* or *Pṛithivī*, the earthly double of the former.[3]

On both sides of the god there are represented on the back slab eight small figures, one above the other and four on each side, representing eight out of the nine *grahas* of Hindu astronomy, the sun being the ninth. Flames are also shown on the back slab, as also two symbols on each side, the exact significance of which we are unable to understand. The one resembles an arrow, or a *Śakti*, and the other a crescent with a ball on it supported on a shaft. Above, on either side, a flying *gandharva* with garland overhangs the pointed stela which is topped by a *Kīrttimukha*.

The seated image of Sūryya is a rarity. So far as we are aware only two other such specimens have been found in North-Eastern India. One of them, an octo-alloy miniature from the ruins of Deulbāḍī in the district of Tipperah (where it was discovered along with an inscribed image of Śarvāṇī of the 7th-8th century A.D.[4]) has now been set up in the temple at Chandimudā close to the Lalmai station on the A.B. Railway. The Tipperah specimen, though much earlier in date, agrees in general with the present one from Dinājpur, the only difference being the absence of the two queens of Sūryya in the Tipperah specimen. The difference however is not serious when we remember that in the earlier (8th century) images of Sūryya [1] the two queens generally do not occur. The Museum of the Varendra Research Society also has a copper miniature of a seated Sūryya, recovered from the neighbourhood of Mangalbari in Dinājpur.[2] It represents the four-armed deity seated at ease on the seven-horsed chariot which *Aruṇa* is driving from behind. This specimen—which has to be dated in the 15th-16th century A.D.—presents however a wide divergence from the image under discussion.

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[1] Cf. 1, and *Vishṇudharmottaram*, III, 67.
Dakshiṇe Piṅgalo=bhāge karttavyaś=chātipiṅgalaḥ |
also *Bhavisha, Purāṇa*, 124, 19.
Agnir=dakshiṇapārśve tu piṅgalatvāt sa Piṅgalaḥ |
also *Matsya Purāṇa*, 261, 6.
Lekhanīkṛitahastañcha pārśve Dhātāram=avyayam |

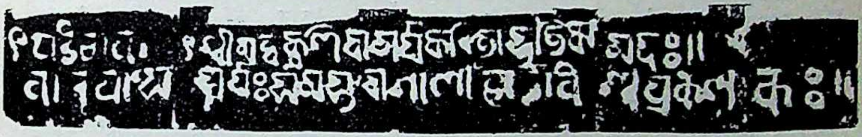
[2] Cf. 51, 2.
Vāme tu Piṅgalo=Dvāri Daṇḍabhṛit sa raver=gaṇah |

[3] Cf. *Agni Purāṇa*, 51.
Vālavyajanadhāriṇyau pārśve Rājñī cha Nishprabhā (Nikshubhā) |

[4] Bhattasali, N. K., *Iconography of Buddhist and Brahminical sculptures in the Dacca Museum*, p. 172, pl. LIX.

At the base of the sculpture there is an inscription in two lines. The first line is in two parts, the first part containing fourteen letters and the second two only. The second line is divided into three parts, the first containing eleven, the second four, and the third one letter only. The two lines together form a regular *Anushṭubh* verse. It opens with the sign for *Oṁ* and seems to record the name of the donor, who, after causing the image to be made, dedicated it.

L. 1. *Oṁ. Śrīmad=vaktraśivāchāryaka(kā)rito=bhu-(bhū)tika(kā)madaḥ* |
L. 2. *Sūryaḥ samastarogānāṁharttā viśvapraka(kā)-śakaḥ* ||



(The sign after '*bhu*' in the first line which looks like the sign for *ā*, appears to be only a mason's mark as it goes above the line.)

'(An image of) Sūryya (the Sun-god), the bestower of welfare and desire (of the people), the remover of all diseases and the irradiator of the Universe, has been caused to be made by the illustrious *Vaktraśivāchārya*.'

To the right of the above inscription there are two short lines each containing four letters, the first line of which opens with the symbol for *Oṁ*.

L. 1. *Oṁ. Paṁḍarīka*
L. 2. *Vārapāsa*

This inscription most probably gives the name of the artist, executing the image, as *Vārapāsa*, who is a *Puṇḍarīka* (*Puro* in common parlance) by birth. *Puṇḍarīka* which seems to have come from *Pauṇḍraka* most probably represents the territorial name of the original inhabitants of *Puṇḍra*, i.e. North Bengal.

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[1] Cf. *V.R.S. Ann. Rep.*, 1926-27, pl. I, fig. 1, and *Rupam*, No. 40, fig. 4.
[2] *V.R.S. Ann. Rep.*, 1927-28, fig. 3.

Neither of the inscriptions contains a date, for which therefore, palæographical considerations are our only guidance. The characters are old Bengali with only a few exceptions, such as *Cha*, *Ṇa*, *Sa*, and *Ha*, but we do not get the Bengali form of these letters before the 15th century A.D. Most of the letters, viz. *Cha*, *Ḍa*, *Da*, *Pa*, *Ya*, *Ra*, *Śa*, and *Sa* are similar to the corresponding letters of the Tarpandighi (Dinājpur) copperplate of the year 2 [1] (1180 A.D.) of Lakshmana Sena, and the Dacca image inscription of the year 3 [2] of the same King (1181 A.D.). But other letters such as *Ka*, *Ṇa*, *Ta*, *Ma*, *Va*, and *Ha* show later forms, some resembling those of the Sāhitya Pariṣat Copperplate of Viśvarupasena [3] (*c.* 1st quarter of the 13th century A.D.), one or two, e.g. *Ta*, *Va*, exhibiting forms still later. It will not be unreasonable therefore to ascribe the epigraph on these grounds to the first quarter of the 13th century or even a little later.

If the dating of the inscription, and thus of the sculpture, is correct it would appear that even after the invasion of Muḥammad-i-Bak͟htiyār in 1202 A.D., the Hindus remained in possession of Bairhāṭṭā for sometime longer. The confirmation by Mr. Stapleton, after a study *in situ*, of Mr. E. V. Westmacott's theory that the site of Ekdālā—the fortress from which both Ilyās Shah and his son Sikandar Shah of Bengal successfully beat off the attacks of the Emperor Firūz Shah of Delhi in 1354-55 and 1358-59 A.D.—should be identified with Bairhāṭṭā,[4] shows however that the Hindus had lost this important fortress by the middle of the 14th century, i.e. within 100 years of the date assigned to this inscription.

March 8th, 1933.

Note.—We have to thank Mr. K. N. Dikshit, Superintendent, Archæological Section, Indian Museum, for his courtesy in supplying a photograph and estampage from which the annexed plate has been prepared.

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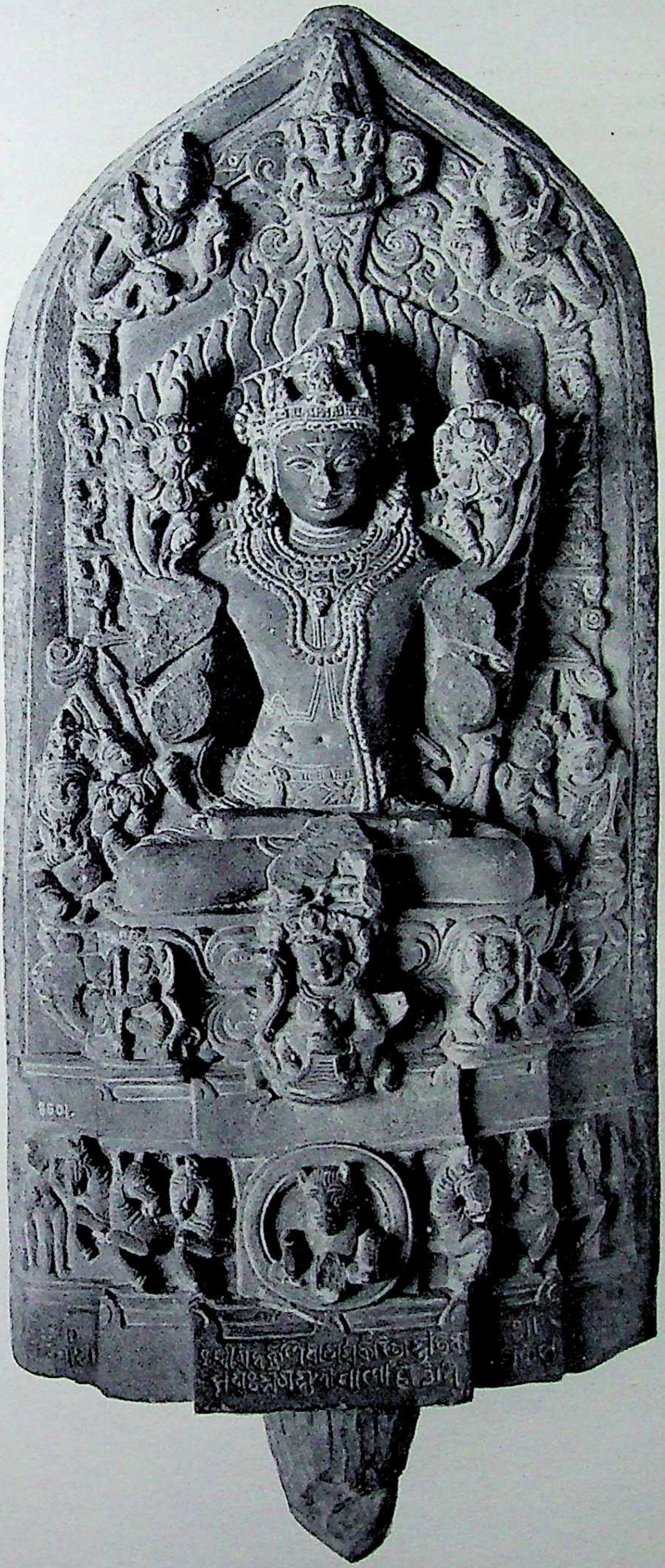
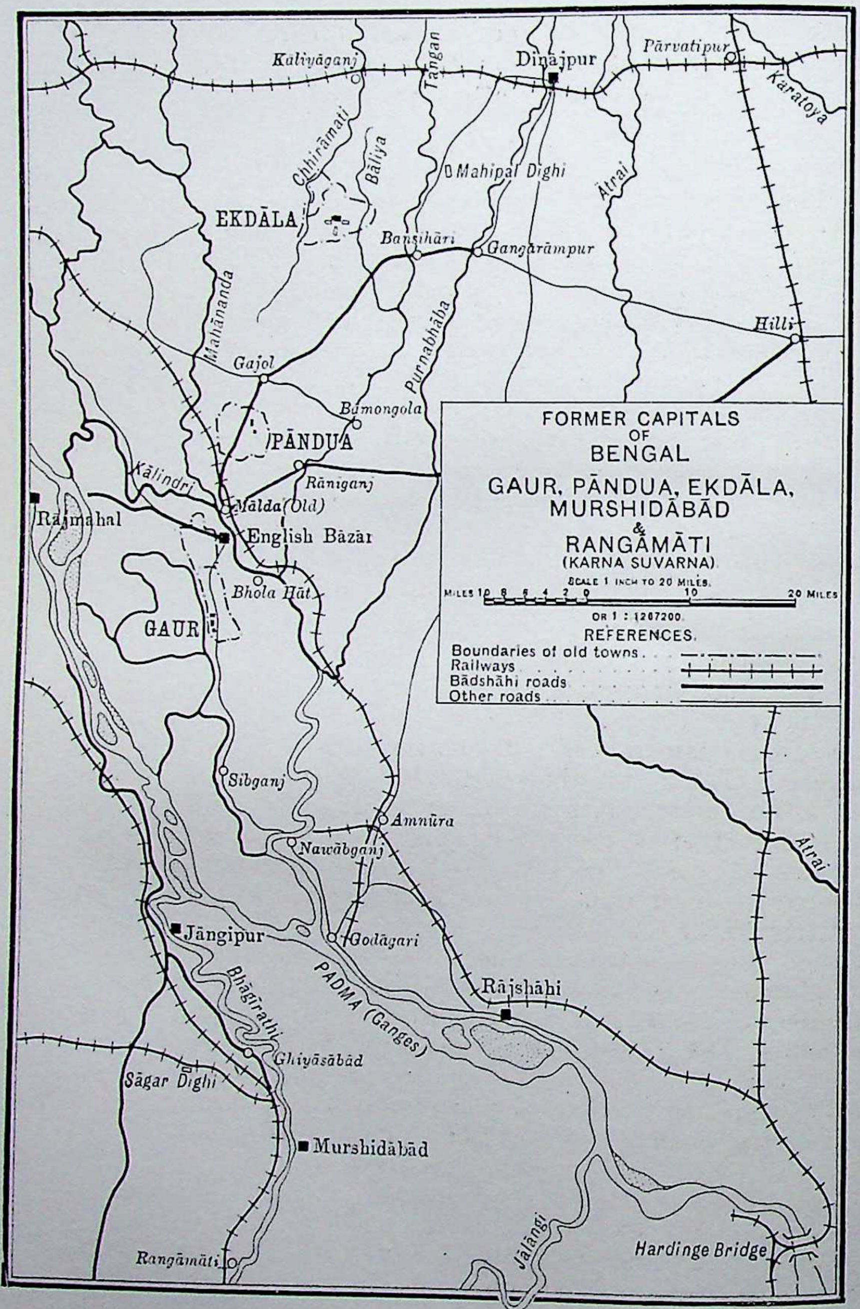
[1] *Ep. Ind.*, Vol. XIII, p. 8 and pl.
[2] Majumdar, N. G., *Inscriptions of Bengal*, Vol. III, pp. 116–27 and pl.
[3] *Ibid.*, pp. 140–48 and pl.
[4] *J.A.S.B.*, 1874, part I, pp. 244-45.





FORMER CAPITALS
OF
BENGAL
GAUR, PĀNDUA, EKDĀLA,
MURSHIDĀBĀD
&
RANGĀMĀTI
(KARNA SUVARNA)

SCALE 1 INCH TO 20 MILES.
MILES 10 8 6 4 2 0 10 20 MILES
OR 1 : 1267200
REFERENCES.
Boundaries of old towns
Railways
Bādshāhi roads
Other roads
Kaliyāganj
Tangan
Dinājpur
Pārvatipur
Karatoya
Chhirāmati
Bāliya
Mahipal Dighi
Ātrai
EKDĀLA
Bansihāri
Gangārāmpur
Mahānanda
Purnabhāba
Hilli
Gajol
Bamongola
PĀNDUA
Kālindri
Rāniganj
Mālda (Old)
Rājmahal
English Bāzār
Bhola Hāt
GAUR
Sibganj
Amnūra
Nawābganj
Ātrai
Jāngipur
Godāgari
Bhāgirathi
PADMA (Ganges)
Rājshāhi
Ghiyāsābād
Sāgar Dighi
Murshidābād
Rangāmāti
Jalangi
Hardinge Bridge

ARTICLE No. 6.

Note on the Historical and Archæological results of a Tour in the Districts of Māldah and Dinājpur, December 24th–31st, 1932.

By H. E. STAPLETON.

The objects of this tour were : (A) to verify the site of the battle between Sikandar Shah and his son Ghiyāsuddīn in which the former lost his life *c.* 1390 A.D. ; (B) to make further enquiries regarding the old Hindu city of Ekdālā before which two battles took place between Firuz Shah of Dehli and (*a*) Shamsuddīn Ilyās Shah of Bengal in the spring of 1353-4 A.D. and (*b*) Sikandar Shah, Ilyās Shah's son, in the cold weather of 1358-9 A.D. ; and (C) to enquire into the possibility of Karanji, a large *mauza* 15 miles to the W.S.W. of Dinājpur, being the native village of Rājā Ganesh who (with his son Mahendra) reigned over Bengal for a short period about 1416–19 A.D.

(A) THE SITE OF THE BATTLE IN WHICH SIKANDAR SHAH WAS KILLED.

The *Riyāzu-s-Salāṭīn* (Abdu-s-Salām's translation, p. 107) says Ghiyāsuddīn advanced with a large army from Sonārgāon, and encamped at a place called Sonārgādhī. The actual fight took place at Goalpara. Various conjectures have been made where this Goalpara was. Blochmann (*J.A.S.B.*, 1873, p. 256) suggested that it was the village three miles S.W. of Pandua (i.e. within the ramparts of that town that have been discovered by examination of the recently-taken air photographs) while Dr. Wise (*J.A.S.B.*, 1874, p. 85—following Taylor, *Topography of Dacca*, p. 109) argued it was near Ja'farganj, a place that formerly existed in the west of the Dacca District, nearly opposite the present Goalundo at the junction of the Ganges and Jamuna. On the other hand, as I pointed out in my Presidential Address to the Numismatic Society at Patna in December, 1930 (*Numismatic Supplement*, No. XLIII, *J.A.S.B.*, p. 5), neither of these suggestions are probably correct in view of the information contained in Buchanan Hamilton's *Historical Description of Dinājpur* (published by the Asiatic Society of Bengal in 1833) which seems to have chiefly been drawn from a 16th century Persian MS. that this explorer obtained in Pandua in 1808 (*op. cit.*, pp. 22, 25, and 69). In this work, it is stated (p. 23) that Sikandar 'fell in battle at a place called Satra near Goalpara (probably the Chattera river) which is situated between the Tanggon and Punabhoba [rivers] near a favourite country residence of the King'. Elsewhere (*op. cit.*, p. 40) Buchanan Hamilton states that this residence was 'on the banks of the Tanggon, about 8 or 9 miles south from Bamongola. The ruins are said to be very extensive and to contain many bricks and stones'. Apparently from the next paragraph (quoted in the footnote below) Buchanan Hamilton understood this place to be called Sekundura, but the only *mauza* of this name—written in the 1″=1 mile Sakandra—that is known at present is 6 miles further south in the *bil* on the other side of the Tangan, and about a mile from the river.

It may be observed in this connection that as no Moslem authority has ever expressed the slightest doubt about Sikandar Shah, the builder of the Adīna Mosque, having been buried in the annexe to that Mosque, the identification by Buchanan Hamilton of the site of the battle is far more probable than Taylor's story of the battle between Sikandar Shah and his son having taken place far away from Pandua at Goalpara in the Dacca District, near the present junction of the western end of the Dhaleswari and the Jamuna. The alleged tomb of Sikandar Shah at this Goalpara had fallen into the river before the close of the 18th century, and even Dr. Wise may have had some doubt of the truth of the local Dacca story, as he notes, with regard to a *Dargāh* of Sikandar Shah that had existed until just before he wrote in 1874 at Goariah, 10 miles to the west of the Dacca Goalpara, that the then 'oldest inhabitant' was positive that the *Dargāh* was that of a faqīr and not that of a King (*op. cit.*, note†).

Owing to my not being able to find an opportunity, prior to the close of last year, of visiting the site indicated by Buchanan Hamilton, enquiries were started through the local Inspectorate, and two years ago I was informed by M. Najmu-l-Husain (Assistant Inspector of Schools for Muhammadan Education, Rajshahi Division) that he had discovered at a place called Rānīganj on the Tangan, about 8 miles south-west of Bamangola, a ruined bridge, with fortified bridge-heads, and that a well-raised *Bādshāhī* road[1] ran from this bridge eastward.

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[1] This road is evidently the one referred to in the following paragraph on p. 40 of the *Historical Description of Dinājpur* where it directly follows the passage already quoted. It is hardly possible that the road was constructed by Husain Shah, though he may have repaired it. It is a pity that (like Rennell) Buchanan Hamilton was not able personally to visit the bridge-site, or we might now possess a full description of the place with its connected roads that would throw fuller light on their history.

'Hoseyn Shah formed a fine road through the country between the Tanggon and Punabhoba, and it is said to have extended to Ghoraghat; but I have not been able to trace it. The width is said to have been 348 cubits, with a large ditch, and many fine trees on either side, and bridges constructed of bricks. The whole is overgrown and gone to ruin; from these dimensions, it must rather have been a work of ostentation than utility, and probably was rather an appendage to the country residence of the Kings at Sekundura, than a military way to Ghoraghat.'

At Bamangola—which is still a *Thānā* Headquarters—the Tangan river runs practically North to South, but it then begins to bend to the S.W. and after 4 miles or so turns almost completely west, being flanked on the south bank for 2 or 3 miles by the *Bādshāhī* road. Finally, at a place called Rānīganj, the river takes a sharp bend to the south and formerly was spanned by the bridge already mentioned. At some time however the river broke through the road close to Rānīganj, and the main course of the river now lies a little to the East, and only a narrow stream is now left along the original course which runs through what was the southernmost arch of the bridge, though the actual arch has now disappeared. The remaining spaces between the piers seem to have been deliberately filled up. It is difficult to be certain as to what happened, but an inspection of the ruins of the bridge suggests that its present condition is due to the efforts of an invading army from the east to force a passage across the river after the bridge had been broken down by adversaries who held the western bank. The broken archways seem to have been filled up to make a causeway except for the southernmost one, which, perhaps, it was hoped to bridge by timbers, or force a passage through the water by elephants. The natural result of confining the stream to such narrow limits was to cause extreme pressure higher up stream along the *Bādshāhī* road and this led to the road being breached and the bridge, with half a mile of road to the north, left as a sort of island. This would naturally cause the former river bed to become very shallow, and if a sufficient force—as well as some elephants—remained on this island, it is just conceivable that, in their desperate plight, they might have successfully fought their way across, and then moved up stream to the western bank near Rānīganj above the break, so as to facilitate the crossing of the rest of the invading force.

The village of Rānīganj (or rather group of villages) is variously known as Rānīganj, Rānīgarh, Goalpara,[1] and Fuldangi, and stands on high land at a spot where two ancient roads converged. One of these (to be mentioned later) ran N.W. to the Eastern Gate of Pandua, while the other (which, up to now, no one seems to have observed—Rennell, for instance, does not show it in any of his maps) is the continuation of the main *Bādshāhī* road from the East, and runs in an almost direct line to Old Māldah. The *bil* that is situated immediately to the south of the ruined bridge is still known as Chatra[1] *Bil*, and possibly once extended much further to the south as another *bil* of the same name is found at the other end, and just to the east of the *Bādshāhī* road near Old Māldah. If so, it evidently marks a former bed of the Tangan. Buchanan Hamilton's reference to the Chattera river (though only based on hearsay) rather suggests that in his time—125 years ago—there was actually a small stream in this neighbourhood called Chattera or Chatra, which may have been a branch of the Tangan, flanking the *Bādshāhī* road to Old Māldah on the East.

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[1] The names Goalpara and Chatra are common ones in the vicinity for, besides the Goalpara within the perimeter of Pandua in its S.W. corner, there is another village of this name 3 miles east of Rānīganj on the Eastern *Bādshāhī* road, while 4 miles south of this is a village called Chatra on another road, running roughly N.E. to S.W. along the slightly raised watershed between the Tangan and Purnabhavā rivers.

As regards the name Sonārgādhī given by the author of the *Riyāzu-s-Salātīn* as the place where Ghiyāsuddīn encamped before the battle in which his father Sikandar Shah was killed, we have on the one hand the name Rānīgarh, while on the other the names of the *mauzas* immediately adjacent to Rānīgarh on the west are Sonabar and Sonapur, so that the name mentioned by Ghulām Husain is readily understandable. In view of all the facts now stated, it seems practically certain that the battle between Sikandar and his rebellious son took place in the immediate vicinity of this vitally important river-crossing on the main *Bādshāhī* road from Ghorāghāt to Gaur.

Further enquiries at the time of my visit showed that a *pucca* brick-on-edge road ran to the Adīna Mosque from Rānīganj, and, on following this up, a fine and well-cambered specimen of the roadway was found absolutely intact, just inside the Eastern Gate of Pandua where the road passed through the eastern line of fortification. The road here measures as much as 51′ in breadth, and this specimen of the old road should certainly be proclaimed as a protected monument by the Archæological Department, as nowhere else (so far as is known) has any similar stretch of road been found. If the identification of the site of the battle with Rānīganj-Goalpara is correct, it was evidently along this road that the victorious Ghiyāsuddīn rode after the battle to slaughter his 17 elder brothers and to take possession of his father's palace at Satāīsghara—immediately to the west of the Adīna Mosque—about 7 miles distant from Rānīganj.[1] It is worth noticing that while, near this Eastern gate, no details of the structure of the city wall of Pandua can be traced, on the other side of

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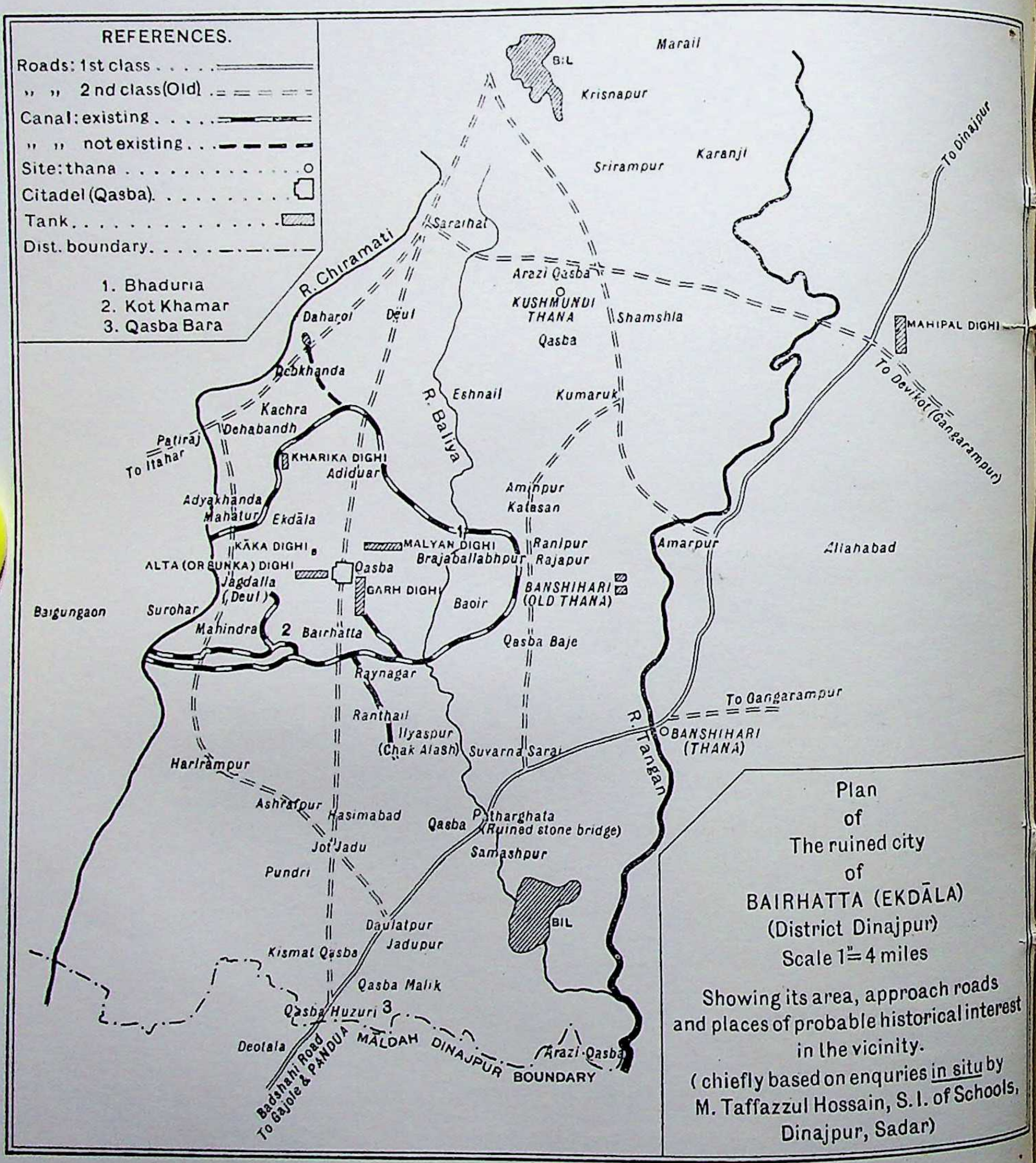
[1] Sikandar Shah, and his father Ilyās Shah, when they settled at Rānīganj and Satāīsghara, only reoccupied places that were previously used as residences by the Hindu Kings of Pandua. In the case of Rānīgarh, its previous existence under Hindu rule, as far back probably as the 10th century A.D., is shown by the style of the capital described by Babu Sarasi Kumar Saraswati in the first of his annexed papers, while the antiquity of the citadel of Pandua in which Ilyās Shah built the Satāīsghara Palace is indicated not only by its immediate proximity to the large N × S tank (now silted up) known as the *Sukān Dighi*, but also by the 9th century inscription found by Sarasi Babu on one of the pillars of the Adīna mosque.


REFERENCES.
Roads: 1st class
" " 2nd class (Old)
Canal: existing
" " not existing
Site: thana
Citadel (Qasba)
Tank
Dist. boundary
1. Bhaduria
2. Kot Khamar
3. Qasba Bara
BIL
Marail
Krisnapur
Srirampur
Karanji
To Dinajpur
R. Chiramati
Sarathal
Arazi Qasba
KUSHMUNDI THANA
Shamshla
Qasba
MAHIPAL DIGHI
To Devikot (Gangarampur)
Daharol
Deul
Debkhanda
R. Baliya
Eshnail
Kumaruk
Kachra
Patiraj
Dehabandh
To Itahar
KHARIKA DIGHI
Adiduar
Aminpur
Kalasan
Adyakhanda
Mahatur
Ekdāla
KĀKA DIGHI
MALYAN DIGHI
Brajaballabhpur
Ranipur
Rajapur
Amarpur
Aliahabad
ALTA (OR BUNKA) DIGHI
Qasba
GARH DIGHI
BANSHIHARI (OLD THANA)
Jagdalla (Deul)
Baoir
Baigungaon
Surohar
Mahindra
2
Bairhatta
Qasba Baje
Raynagar
To Gangarampur
R. Tangan
Ranthail
Ilyaspur (Chak Alash)
Suvarna Sarai
BANSHIHARI (THANA)
Harirampur
Ashrafpur
Hasimabad
Qasba
Patharghata (Ruined stone bridge)
Jot Jadu
Samashpur
Pundri
BIL
Daulatpur
Jadupur
Kismat Qasba
Qasba Malik
Qasba Huzuri
3
Deotala
Badshahi Road To Gajole & PANDUA
MALDAH DINAJPUR BOUNDARY
Arazi Qasba

Plan
of
The ruined city
of
BAIRHATTA (EKDĀLA)
(District Dinajpur)
Scale 1" = 4 miles
Showing its area, approach roads and places of probable historical interest in the vicinity.
(chiefly based on enquiries *in situ* by M. Taffazzul Hossain, S. I. of Schools, Dinajpur, Sadar)

the city, two miles to the west of Adīna, my wife and I were fortunate enough to find a section of the western embankment[1] which showed that, when it was made, first a wall 8½ ft. thick was built and then earth was heaped up on both sides from an external and internal moat.

(B) THE FORT OF EKDĀLĀ, TWICE BESIEGED BY FIRUZ SHAH.

The site of this place has also been much discussed. Blochmann merely quoted the statement of Muhammadan historians that it was near Pandua. Westmacott was told in 1874 by the Manager of the Chanchol estate in Māldah District that he had come across a tract of high land which the local people called Ekdālah, and, from a study of the Survey map, coupled with a quotation from Buchanan Hamilton, Westmacott decided that it lay between the Chirāmatī and Bāliya rivers (*J.A.S.B.*, 1874, pp. 244-5). The correctness of his conclusion was however disputed by Beveridge in his analysis of Ilāhi Bakhsh's *Khurshīd-i-Jahān Numā* (*J.A.S.B.*, 1895, pp. 227–229) and, following Taylor (*op. cit.*, p. 115), Beveridge very rashly decided in favour of the Ekdālā on the Lakhya river in the north of Dacca District.

The only other suggestion for the identification of the site that has since been published is the one contained in the late Khān Sāhib 'Abid 'Alī Khān's *Memoirs of Gaur and Pandua* (pp. 17 and 23) that Ekdālā was at Bisānkoṭ (or Kālāpāhār Garhī) at Murchā on the Kālindri river—a stronghold that was constructed about 1220 A.D. by Ghiyāsuddīn 'Iwaz, an early semi-independent Governor of Bengal. As, however, I pointed out in a note on p. 23 of the Khān Sāhib's book, the chief objections to this theory are (*a*) that there is no place called Ekdālā in the vicinity of Murchā: and (*b*) that, if correct, it would imply that instead of retiring from Pandua on the approach of Firuz Shah, both Ilyās Shah and Sikandar Shah threw themselves into a fort which lay on the road that Firuz Shah had already traversed. Apart from the psychological improbability of any such strategical move on their part, this would only have resulted in their being immediately surrounded and besieged as—in addition to the roads from Upper India (either viâ Rājmahal or Purnea) leading past Bisānkoṭ—there was easy access to Bisānkoṭ on the east from Old Māldah (Firuzpur) which Firuz Shah had already reached. I further noted that the Persian history, obtained by Buchanan Hamilton at Pandua, stated that Ilyās Shah retired to *Ghorāghāt*, and that if this is correct, the site of Ekdālā must be looked for along the military road to Devīkoṭ that was constructed by Ghiyāsuddīn, and at least 7 *kos* (14 miles) from Pandua.

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[1] As is evident to anyone who rides over the country immediately to the west of Pandua, the original course of the Mahānandā must have been quite close to the entire western face of the city, and, in all probability, this constitutes the chief reason why Pandua is sited where it is.

I accordingly asked M. Tafazzul Hossain, Sub-Inspector of Schools, Dinājpur (Sadar), in whose area Westmacott's Ekdālā lies, to tour in this direction, and as his report included the mention of the existence of a moat round the entire area in which Ekdālā, Bairhāṭṭā (*Qaṣbah*), and the three large adjacent tanks are found, I took the earliest opportunity of visiting the place myself. What I then saw (1930) convinced me of the accuracy of Westmacott's opinion, and the present tour was chiefly undertaken with the object of verifying my previous observations as well as of collecting further historical data.

The information supplied by the principal Muhammadan authorities (Ziya Barani, Shams-i-Sirāj Afīf, and Ghulām Husain—in the *Riyāzu-s-Salātīn*) as to the topography of Ekdālā is somewhat scanty and may be summarized as follows :—

(1) Ekdālā was a *mauza* near Pandua, which had water on one side and jungle on the other (Barani).

(2) It was called the 'Islands of Ekdālā' and was provided with a moat 20 *gaz* (60 ft.) broad (Afīf). Before it was a large deserted plain—the latter evidently cleared of villages to prevent Firuz Shah getting supplies.

(3) It was *beyond* Pandua to anyone approaching Pandua from the Rājmahal or Gaur direction, i.e., viâ Old Māldah, which, Ghulām Husain says, Firuz Shah used as his base. Ziya Barani also notes that when Firuz Shah, in his first expedition, retired from before Ekdālā, Ilyās Shah pursued him, thinking that the enemy was retreating to the 'City' (i.e., Pandua). Afīf says Firuz Shah had decided to fall back 7 *kos* towards Delhi to tempt Ilyās Shah to come out of Ekdālā.

(4) Firuz Shah, on his feigned retreat, had reached the bank of a river[1] 7 *kos* from Ekdālā, where the eddies had formed a ford, before he was overtaken by Ilyās Shah. The resulting battle ended in the flight of Ilyās Shah back to Ekdālā, and, after he had succeeded with difficulty in re-entering the *Fort*, Firuz Shah's forces occupied the adjoin-

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[1] Ziya Barani does not mention where the battle took place except that it was on a deserted plain. The name of the river is not mentioned by Afīf, who, like Ziya Barani, was a contemporary of the events he describes. It is only the authors of the later *Tarīkh-i-Mubārak Shāhī* (c. 1425 A.D.) and *Tabaqāt-i-Akbarī* (c. 1592 A.D.) who say the river was the Ganges, and Ghulām Husain repeated this statement.

ing *town*. The bodies of the 180,000 soldiers who are said to have fallen in the battle were scattered over the 14 miles of *plain* between the river and Ekdālā. Pandua was still further from Ekdālā, as, according to Afīf, whose father certainly accompanied Firuz Shah in his second invasion of Bengal and, possibly, served in the first campaign as well, it was a halting place on the way back to Delhi from the site of the battle. Ziya Barani's statement that Ekdālā was 'near to Pandua' is therefore only relatively correct, as from one writing at a distance.

(5) The reference (in Afīf's account of the second invasion of Bengal) to the repairs to an earthen bastion of the Fort of Sikandariya at Ekdālā that had collapsed (? into the moat) being supervised by Sikandar from the 'Eastern Roof' suggests that this attack on Ekdālā took place from the East. It is however also stated that the Islands of Ekdālā were 'surrounded' on this occasion by Firuz Shah's forces.

(6) Ghulām Husain adds yet other piece of information, viz. :—that, during the first siege of Ekdālā, a Saint called Shaikh Rājā Biyabānī, in whom Ilyās Shah had great faith, died and that the King, in the guise of a mendicant, not only attended the Shaikh's funeral but also, on his way back, rode alone to see Firuz Shah and, without the latter recognising him, returned to Ekdālā. As 'Abid 'Alī Khān (*op. cit.*, p. 23) was able to identify the site of the Saint's tomb as being at the village of Almāspur, outside the N.E. corner of the perimeter walls of Pandua, and about 4 miles east of the subsequently erected Adīna Mosque, this shows that Ekdālā must have been within reasonably short riding distance of Almāspur and Pandua.

(7) Afīf says that Firuz Shah renamed Ekdālā Āzādpur, and Pandua Fīrūzābād. Little attention need be paid to this as the Muhammadan name of Pandua had already been Fīrūzābād for probably 50 years (being named after Shamsuddīn Firuz Shah, King of Bengal from 1301 to 1321 A.D.); while the name given to a place from a distance by an unsuccessful invader is hardly likely to have been adopted by the local people.

(8) Finally, Ghulām Husain (on pp. 132 and 133 of Abdu-s-Salām's translation of the *Riyāzu-s-Salātīn*) says Husain Shah, King of Bengal from

> 1495 to 1520 A.D., removed his seat of Government to Ekdālā. This shows that Ekdālā must have been a big place : *vide* also the reference in Afīf's account of the first expedition to there having been then a town in connection with the Fort of Ekdālā. Ghulām Husain adds that for the maintenance of the rest-house of the Saint Nūr Qutbu-l-'Ālam (of Pandua), Husain Shah endowed several villages and every year he used to come to Pandua for pilgrimage to the shrine of that Saint.

Let us now turn to the question of whether the Ekdālā of Westmacott agrees with the indications afforded by Muhammadan historians. Westmacott has given a few extracts from the reprint by Montgomery Martin of Buchanan Hamilton's account of the site but, as the latter contains the earliest information after a personal visit in 1808, it is desirable to quote his account in full (pp. 38 and 39 of the 1833 reprint). It should be noted that the *Thānā* was not then situated where it now is on the eastern bank of the Tangan, close to where the *Bādshāhī* road reaches the river, but at Bansihāri *Hāt* (or Jor-dighia), three miles to the N.N.E., near the twin tanks two miles to the east of Brajaballabhpur and a mile away from the western bank of the Tangan.

'There are several antiquities near the *Thānā*; at about half a mile south from this place is a small Hindu temple, called a *Mondir*, a work apparently of considerable antiquity. Its base is a quadrangular prism, about 20 feet high and 12 wide. Its summit is a pyramid of about the same height. This part of the building has been much ornamented with carved bricks, especially a kind of a escutcheon on each face, that possesses some degree of good taste. The artists have been ignorant of the method of constructing an arch ; for the door is contracted above, to a point, by the horizontal rows of bricks, gradually encroaching on its width ; not the smallest tradition remains concerning its founder, and the image has been removed.'

'At a little distance west from this *Mondir* begins a narrow elevated ridge of land, perhaps half a mile wide which extends west to the Beliya about two miles, and seems to me entirely artificial. It is everywhere full of small tanks, inequalities, and heaps, many of which consist almost entirely of bricks. The largest of these has been lately opened, probably in part to look for hidden treasure, and in part to procure bricks for building an office (*kuchery*), for collecting the rents, and this latter view has not been in vain. The building has probably been a temple, in form of a polygon. The outer wall is about four feet thick. At the western end of this elevated space are two tanks of considerable dimensions, which are almost filled up, and entirely choked with weeds. The place is called Brojobollobhopur, and I have no doubt has been a considerable town: but no tradition remains.[1]'

'About 1¼ mile west from the Beliya, is a very large tank, called Melandighi,[2] which is nearly choked with weeds. The only tradition concerning it is that it was dug by a princess (*Rāni*), and that a miracle was necessary to procure water. About 1¼ mile further west is Gordighi,[2] a tank, the water of which has extended about 600 yards N. and S. and 400 yards E. and W., and which of course is a Hindu work. A considerable portion of it has now so far filled up that it is cultivated for rice. About 1,200 yards west from this tank is another, called Alta Dighi,[2] which extends nearly to the same dimensions, but is placed [like the Malyan Dighi] with its greatest length from east to west, and therefore is a Muhammadan work. Between these two tanks are the ruins of Borohata, which are very large heaps or mounds, that consist in great measure of bricks. In many places the foundations of walls may be traced, and even the dimensions of the chambers. All these chambers are of a small size owing to which they may have resisted the attacks of time better than more spacious apartments. They are chiefly situated in the southern division of the town called Kutwari [? Kotwāli, or Kotbārī]. In this part are some small tanks that have evidently been entirely lined with brick. In the centre of the ruins are indubitable traces of a small square fort, which has been surrounded by a double wall of brick and an intermediate ditch. The ruin to the north of this fort is almost entirely without the trace of regular form, but the quantity of bricks which it contains is great. At its northern extremity is the monument of a Muhammadan *Pir*, Budul Dewan, which is built of brick; in its gate are two stones, but there is nothing about them to determine whether they have been brought by the founders, or taken from the ruins. There is no sort of tradition concerning the persons who either founded or destroyed these works.'

Apparently Buchanan Hamilton did not explore the even more interesting western area of the site along the Chirāmatī River[3]: but, when describing the neighbouring Division of

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[1] It was in the Kutchery at Brajaballabhpur that we found an inscribed image of Nārāyaṇa, dating, according to Babu Sarasi Kumar Saraswati, from the 12th century A.D. (*vide J.P.A.S.B.*, Vol. XXVIII, 1932, page 179). This may indicate the date of the temple referred to by Buchanan Hamilton.

[2] According to the Survey of India 1″=1 mile *mauza* map, the Garh Dighi (including its banks) measures 1,400 yards by 350 yards: the Malyan Dighi is only slightly smaller (1,400 × 250): while the Alta (or Sunka) Dighi measures 1,200 yards by 250 yards.

[3] *Vide* Sarasi Babu's annexed second paper describing his visits to Daharol, Kachrā, Dehābandh, Patirāj, Ādyakhaṇda, Māhâtur, Jagdallā, Mahendra, and Surohor. It is curious that Rennell does not seem to

Kaliyaganj which ran parallel to the Bongsihari Division on the west, he mentions (*op. cit.*, p. 37) that one of the only two brick houses in the whole of that Division, 'belonging to Guruprosad of Sorur [possibly Surohor[1]], is a place very much becoming the residence of a gentleman. It is situated in a large piece of ground finely wooded and has been surrounded with a ditch and rampart of earth, now considered as unnecessary, and allowed to go to ruin. The family of the present proprietor has enjoyed the estate for some time'.

Dealing now in detail with the question as to how far the site agrees in topography with the data supplied by Muhammadan historians, the starting-off point in my further consideration of the problem—apart from the facts, first pointed out by Westmacott, that close to Bairhāṭṭā there is a large *mauza* named Ekdālā after which the whole adjacent area might have been called, and the existence of a Fort (*Qaṣbah*) occupying the space between the ends of the three great tanks—was the report of M. Tafazzul Hossain that the area is still surrounded by a ditch at least 15 miles in length, which was evidently supplied with water from the two adjacent Chirāmatī and Bāliya rivers between which most of the area stands. This is not all: for a further moat has been excavated round another large area two miles broad from North to South and stretching at least one mile eastward of the Bāliya, in which is included several *mauzas*: e.g., Brajaballabhpur, Bimanandapur (*alias* Bhaduria), Mangrail, Chandipur, etc. By this ingenious linking up of the two rivers and extension from the Bāliya, on the East, of another moat—possibly, in the beginning, a subsidiary stream of the Bāliya—there has been produced an area of not less than 23 square miles of human settlement completely surrounded by a moat, and divided by the Bāliya in such a way that the whole area might very well have been given the name ascribed by Afīf to the place besieged by Firuz Shah, viz.: the 'Islands of Ekdālā'.

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have heard of the Chirāmatī, but Buchanan Hamilton refers to it on p. 9 of his *Historical Description of Dinājpur* and says that after its junction with the Beliya, it falls into the Tangan. This is confirmed by the map of the then Subdivisions of the Dinājpur District, that faces p. 582 of Vol. II of Montgomery Martin's *Eastern India*, in which the Chirāmatī is shown bending *south-east* about eight miles south of Harirampur and, after joining the Beliya, the united stream falls into the Tangan about three miles north of Bamangola. Since Buchanan Hamilton's time, the amount of water in the Chirāmatī seems to have decreased, with the result that, instead of joining the Beliya, it now runs south and south-west till it ends at a point just inside the present Māldah District.

[1] This is the village (on the opposite side of the Chirāmatī to Mahendra) where Sarasi Babu obtained the unique Jain image of Ṛishabhanātha, as well as one of Ananta. It is two miles east of Baigungaon, the Rānī of which is said to have been the mother of Mahendra, and to have had residences in Surohor, Mahendra, and other villages in the vicinity.

The next point for consideration is the statement of Afīf that for 14 miles to the south of Firuz Shah's camp before Ekdālā, there stretched a plain over which the defeated troops of Ilyās were chased, and mostly slain, after the battle. This is actually the case with the site we are considering for, south of Bairhāṭṭā, a practically level plain stretches as far as the *Qaṣbahs* (fortified posts) that are found on either side of Ghiyāsuddīn 'Iwaz's Devīkoṭ—Lakhnauti road at the spot where it crosses the southern boundary of the present District of Dinājpur, and the distance—especially if measured from the old *Thānā* mentioned by Buchanan Hamilton, which may very reasonably be considered as the place from which the attack on Ekdālā was directed—is not very much less than the 7 *kos* mentioned by Afīf. A memory of the actual battle may even be preserved in the name of the village Ranthail (Battle Field), which is situated about 1½ miles to the south-west of the spot where the Bāliya leaves the southern moat, while possible references to Ilyās Shah may be found in the name of the *mauza* Chak Alāsh (*alias* Ilyāspur), one mile to the south of Ranthail, as well as in those of two *mauzas*, one called Shamspur (after Ilyās' regnal title Shamsuddīn) which is situated directly to the south of the remains of the stone bridge at Pātharghāṭā that formerly provided a crossing over the Bāliya for the *Bādshāhī* road, and which was protected on the north by two other *Qaṣbahs*: and the other, called Shamsia, immediately to the east of two *Qaṣbahs* that are found to the north and south of the present *Thānā* at Kushmundi.

As for the river which was being crossed by Firuz Shah's baggage when he was overtaken by Ilyās Shah, this was probably the Chirāmatī which, as mentioned previously (Note 3, pp. 159 and 160), followed, until at least the beginning of the last century, a south-easterly course some distance south of Ekdālā, and, after joining the Bāliya to the east of the *Bādshāhī* road, ultimately fell into the Tangan. In the absence of any mention of the Chirāmatī in Ṛennell's maps, there can be no absolute certainty of where it crossed the road, but from my own observations, it appears probable that the crossing was between the first mentioned group of *Qaṣbahs* and the raised site of Deotalā, a mile or so further along the road to the south in Māldah District. The road here runs across low land and is with difficulty kept in use. Moreover, if a fairly deep stream formerly existed at this spot, it would explain the existence of the *Qaṣbahs*, viz.: to prevent invaders from the south crossing to the northern bank.

Just one other point may be mentioned in corroboration of the identity of the Ekdālā of history with the Ekdālā near Bairhāṭṭā, and that is the existence, 18 miles to the north of Bairhāṭṭā, of a country residence of Husain Shah in a *mauza* called 'Chhota Parua', 3 or 4 miles N.E. from the present

Raiganj and a mile or so west of Hemtābād. Buchanan Hamilton makes the following notes on the place (*op. cit.*, pp. 35 and 36).

'About a mile and a half beyond this ruin [i.e., Mohes Rājā's palace, close to which is the mosque erected in 907 A.H. by Husain Shah's General, Rukn Khān, *vide* plate opposite p. 636 of the second volume of Montgomery Martin's *Eastern India*] is another, which has been surrounded by a brick wall, and is usually called the *Tukht* or throne of Hoseyn (*Padshah*) the King. The *tukht* consists of a quadrangular truncated pyramid, of about 20 feet in perpendicular height, and is composed of bricks heaped confusedly together. Intermixed with these are some large carved stones, evidently of the same style as those of Mohes Raja's house; but whether they have been brought from thence, or whether they are the ruins of a temple, that formerly may have been on the spot, I cannot say. On the summit of this pyramid is a considerable square area, in the centre of which a terrace has been raised about three feet high; and this has been regularly built with cement, and its sides have been ornamented with mouldings covered with plaster. It was here, it is said, that Hoseyn Shah sat, and beheld sports which were exhibited at the nuptials of his daughter. South from the pyramid are the ruins of a brick building, the roof of which has fallen in, but the walls are standing, and have been encrusted with carved bricks. The building is nearly square, with arched doors and windows, and is elevated on a brick terrace about five feet high. This is said to have been the house that was erected for the accommodation of the princess during the ceremony, after which the whole seems to have been given to religious men. The tombs of two saints (Weleat and Bahador Shahs) now occupy the throne of the King and many tombs of saints and fakirs surround the pyramid. There is a small endowment of land for supporting the fakir, who supplies the lamps burned at the tombs of the most distinguished of these personages. Between the two ruins many bricks are scattered on the fields, and a very wide road, with a ditch on each side, may be traced most of the way.'

The story current in the locality at the present time is rather different, viz.: that Husain Shah conquered Mohes Rājā, and then himself married the Rājā's daughter at the *Takht*. As is well-known, Husain Shah's chief preoccupation, during the earlier years of his reign—or even earlier—was the extension of the boundaries of Bengal towards the north (Kamatapur, the present Kuch Bihar, which he captured from the last of the Khyen Kings, Nīlāmbar Rājā), and towards the north-east (Assam, which he claims to have conquered even on coins struck in the first year of his reign—899 A.H. or 1493 A.D.). Under these circumstances, it would be quite natural for him to remove the seat of Government further north than Gaur (or even Pandua), and the existence of this 'Little Pandua' still further to the north not only supplies corroborative evidence in support of Ghulām Husain's story of Husain Shah's affection for Pandua, but also lends additional support to the identification of Husain Shah's capital with the Ekdālā at Bairhāṭṭā.

Before passing on to the next section of the paper, a summary may be given of what has actually been observed of topographical and archæological interest within the area which may now be called Ekdālā. As may be seen from the annexed plan (Pl. 4), the enquiries of M. Tafazzul Hossain have shown that the entire area (measuring at its greatest—East to West—length 6½ miles, with varying breadths from North to South of 3, to as much as 6½ miles) is surrounded by a moat upwards of 15 miles in length. The northern moat, which is shown turning south-west from the long *bil* that forms the boundary of the *mauza* of Namair on the south, may even formerly have been prolonged still further to the N.W. as I am informed by the Maulvi that there are traces of a depression, joining the N.W. corner of the *bil* to a small semi-circular *bil* at the north of *mauza* Debkhaṇḍa, though beyond this no trace remains of any junction of the last-named *bil* with the Chirāmatī. If this is correct, Debkhaṇḍa, Kachrā (where Sarasi Babu found an image of the Buddhist goddess Vāgīśwarī, dating back to the 10th-11th century A.D.), and Ādyakhaṇḍa (from which came a 9th century image of Vishṇu Trivikrama, now in the Rajshahi Museum), must have been included within the original boundaries of Ekdālā, as indeed, is suggested in the case of Ādyakhaṇḍa by its name, meaning the 'Original Settlement'. If these *mauzas* are included, the total area surrounded by the moat is 29 square miles whereas without them the area is 23 square miles, so that, in either case, the site is comparable in size with the cities of Pandua, and Gaur at its greatest (both about 25 square miles in area). Apart from the central citadel (*Qaṣbah*) referred to by Buchanan Hamilton, traces of another line of fortification—running east and west and pierced by an *Ādidwār* (Main Gate) have been found about a mile to the north of *Qaṣbah*, but the moat that presumably must once have existed to the north of this rampart has disappeared. Through this gate, and crossing at *Qaṣbah* another road intersecting the city from East to West, ran the main North and South road that branched off from the Lakhnauti-Devīkoṭ road on the south at the group of *Qaṣbahs*, near which I have suggested Firuz Shah, in his strategic retreat from Ekdālā, halted in order to meet the onslaught of Ilyās Shah's army.

The name Ekdālā, which may only have been used in Moslem times to indicate the entire site—the pre-Moslem name being probably Bairhāṭṭā—appears, as already noted, to have been derived from the large *mauza* of that name, close to the north-western end of Alta Dighi. Between it and Alta Dighi lies the much smaller *mauza* of Kāka Dighi where two of the oldest images in the whole site have been found (a Vishṇu of the 8th century and the small head of what was apparently a Yogin, dating from the 9th century A.D.). These (as well as the 8th century Danturā found by Sarasi Babu at Kaṭāshan, in what appears to be a suburb of Ekdālā just outside the moat to the N.E. of Brajaballabhpur, and his 9th century Vishṇu found at Daharol, but probably brought to that place from Bairhāṭṭā) clearly indicate Hindu or Buddhist rule over the town from the beginning of Pāla times and possibly much earlier.[1] The image of latest date is the seated 13th century Sūryya from *Qaṣbah* described by Messrs. N. Chakravarti and S. K. Saraswati in their preceding paper. It is curious that no Muhammadan inscriptions have, up to now, been discovered, but two coins, obtained by M. Tafazzul Hossain at Bairhāṭṭā, were found to be, respectively, (*a*) a specimen of Muhammad bin Tughluq's forced currency—probably struck at Lakhnauti in 730 A.H. and (*b*) a coin of Husain Shah of Jaunpur, dated 865 A.H. If, as seems possible from the occurrence of 13th century images at *Qaṣbah*, Karanji (*vide* next section), and elsewhere in the neighbourhood, this area (though it is so close to the main *Bādshāhī* road to Devīkoṭ) remained under Hindu rule subsequent to the time of Muhammad-i-Bakhtiyār Khilji, the occurrence of the former coin suggests that Bairhāṭṭā was probably incorporated in *Iqlīm Lakhnauti* either at the time of the Dehli Emperor Ghiyāsuddīn Tughluq's invasion of Bengal in 724 A.H. to punish Ghiyāsuddīn Bahādur, or, at the latest, after Ghiyāsuddīn Bahādur's subsequent abortive rebellion, and death, in 728 A.H. when Qadar Khan was Governor of Lakhnauti under Muhammad Tughluq of Dehli (from 725 to 739 A.H. = 1324–1338 A.D.). No images of later date than the end of the 13th century A.D. have been found in, or near, the area under consideration.

(C) KARANJI, THE REPUTED NATIVE VILLAGE OF RĀJĀ GANESH.

The story of Rājā Ganesh's successful ousting of the family of Ilyās Shah from the throne of Bengal at the beginning of the 15th century A.D. is one of the most remarkable episodes in the history of North-Eastern India. I have dealt at some length with this remarkable man and his descendants who ruled over the whole of Bengal between (practically) 1410 and 1442 (when the Ilyās Shah dynasty was restored in the person of Nāsiruddīn Mahmūd) in the 1930 Presidential Address to the Numismatic Society of India already referred to, but, to enable the reader to understand the exact relation of Rājā Ganesh to the Kings of the Ilyās Shah dynasty who preceded him, I will quote the chief paragraph of the account given in Buchanan Hamilton's Pandua MS. (*op. cit.*, pp. 23-24).

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[1] The local people say Bairhāṭṭā was the country residence of Virāṭ Rājā whose capital was Pandua and who kept his horses at Ghorāghāt on the Karatoyā river. Buchanan Hamilton mentions several traditions about this Rājā, in whose time Varendra was called Matsya Deśa (Fish Country) and who was a contemporary of Bhagadatta Rājā of Kāmrup. In order to safeguard his frontier from aggression from the N.E., Virāṭ Rājā kept a considerable part of his army near Ghorāghāt and higher

'Ghyasuddin .... governed 16 years, and was succeeded by his son Syafuddin, who governed three years, and was succeeded by his slave Sahabuddin, who also governed three years. Then Gonèsh, a Hindu and Hakim of Dynwaj [Buchanan Hamilton adds 'perhaps a petty Hindu chief of Dinajpur'] seized the Government. Enraged at Shekh Bodor Islam, and his son Fyez Islam, who refused to give him the compliment due to the rank he had assumed, he put them to death. The saint Kotub Shah [Nūr Qutbu-l-'Ālam of Pandua: died 1416 A.D.], who was still alive, disgusted at this action, wrote to a Sultan Ibrahim [of Jaunpur, 1400–1440 A.D.].......who, in compliance with the request, came from Rajmohal with an army, and encamped at Satra.[1] The Raja of Dynwaj was then terrified, and applied, in great penitence, to Kotub Shah, and obtained his forgiveness by making his son Goduson [? Jadu Sena], a Muhammadan. This convert assumed the government under the name of Jalaluddin, having been reconciled to the saint, and attacked Ibrahim Shah, grandfather of Hoseyn Shah, and having put him to death [?], seized on his government. The old man Gonèsh then confined his son, and seized on the whole kingdom. After having been four years in confinement, Jalaluddin recovered the government and compelled the Hindus to become Muhammedans; but many of them fled to Kamrup, that is to say the country beyond the Korotoya, and which was then probably independent. He governed seven years, and was succeeded by his son Ahmed Shah, who reigned three years. He was destroyed by two of his nobles, Sadi Khan and Nazar Khan, the latter of whom was made King [under the title

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up the Karatoyā. Two forts, said to have belonged to this Rājā, were traced by Buchanan Hamilton, and also two others belonging, respectively, to his brother-in-law, Kichak, and Commander-in-Chief, Madan (*op. cit.*, pp. 19, 33, 48, and 59–64).

[1] Ghulām Husain (*trans. cit.*, p. 115) says Ibrāhīm Shah encamped at Firuzpur. I have already noted that there is still a Chatra *bil* close to Old Māldah (to the east of the *Bādshāhī* road to Rānīganj) and that this is possibly the southern remnant of a much larger *bil* that, as late as Rennell's time, spread much further northward to join the other Chatra *bil* close to the ruined bridge over the Tangan at Rānīganj.

Nāsiruddīn Mahmūd Shah], and erected many buildings at Gaur, to which he seems to have transferred the royal residence.'

Rājā Ganesh struck coins from Pāṇḍunagara, Chāṭgāon (Chittagong), and probably Sunārgāon, under the name of Danuja Marddana, 'Destroyer of the Demons', in 1416, 1417, and 1418, and was succeeded in 1418 by one Mahendra, who may have been a younger son. Very soon afterwards, however, the latter was ousted by (Jadu) Jalāluddīn, who continued on the throne of Bengal from 1419 to 1431 A.D.

Nothing is known for certain as to the exact place from which Rājā Ganesh came. Ghulām Husain calls him Rājā of Bhāturia, by which perhaps is meant the area to the south-east of the Rajshahi Division comprising the present districts of Pabna, Rajshahi, and the eastern portion of Māldah: but if the name is a corruption of Bhāduria, it may refer to any place called by this name, such as the Bhāduria which is an alternative name for the *mauza* of Bimanandpur, lying within the moat of Ekdālā, on the opposite (western) side of the Bāliya to Brajaballabhpur. As for Buchanan Hamilton's suggestion that, by the Dynwaj of his MS., Dinājpur is referred to, it is certainly supported by a statement in the Vaishṇava work *Bālyalīlā Sūtra* (dealing with the pedigree and boyhood of the Vaishṇava saint Advaita, who was born in 1434 A.D.) that Advaita's grandfather, Nṛisinha Nārial, was invited from Sylhet by Rājā Ganesh to Dinājpur and that it was through Nṛisinha's advice as Minister to the Rājā that the latter became King of Gaur in 1407 A.D. As, however, the *Bālyalīlā Sūtra* (which purports to have been written by Kṛishṇa Dās—formerly Rājā Dibya Sinha of Laur in Sylhet—in 1487 A.D.) has only recently been published from a corrected copy of a defective MS., its statements cannot be unhesitatingly accepted, and, personally, I was rather inclined to regard *Dynwaj* as a corruption of the first portion of the regnal title of Rājā Ganesh—viz.: *Danuja* Marddana. Moreover, as Buchanan Hamilton himself points out (*op. cit.*, p. 27) it is difficult to understand how Dinājpur (which, as he says, signifies 'the Abode of Beggars', and was in his time a very poor place, only owing any importance it then possessed, first to the residence of the local Rājās, a very recent event, and secondly to the presence of the officers of Government) was the place from which Rājā Ganesh came. Finally, there is Col. Dalton's suggestion—now specially noteworthy in view of what was discovered during the tour under report—that the name Ganesh (spelt Kāns by Firishta and Ghulām Husain, and Kānsi in the *Ain-i-Akbari*) might be the same as Kōnch or Kōns—the nasalised pronunciation of the word Koch that one still hears in Dinājpur District.

I had already, 3 or 4 years back, disproved, by personal enquiries, the story in some Bengali paper that the seat of Rājā Ganesh was near Hemtābād—the story being due to a confusion between the names of Rājā Ganesh and the Rājā Mohes previously mentioned; and it was therefore with some scepticism that I heard from M. Tafazzul Hosain that a tradition prevailed at the village of Karanji, 5 miles south of the Katihar-Dinājpur-Parbatipur Railway Line, and 9 miles N.E. of Brajaballabhpur, that this was the home of Rājā Ganesh. As, however, there seemed to be some corroborative evidence, I took the opportunity of being in the vicinity last Christmas to pay the place a visit.

We left our camp at Bansihāri *Thānā* by car early in the morning and, on reaching the northern end of the great Mahīpāl Dighi,[1] 10 miles from Bansihāri and about 18 miles S.W. from Dinājpur, we changed to the elephants that were waiting, and after going N.W. over a level plain for 4 or 5 miles, we began to reach the broken area of ground (typical of an ancient settlement) that constitutes the large *mauza* of Karanji. The first objects of interest met with were two mounds—one called *Bheṇḍulā Ḍhipi* and the other *Haṭkholā* (or *Deulāni*) *Ḍhipi*. A quarter of a mile or less from the latter is a spot called Ganeshpārā which is one mass of large bricks, and, immediately to the west of this, is a half-ruined temple called *Sachikā Devī Thān* or *Kaṅs Rājār Pujār Thān*. A *melā* is held at Haṭkholā at the Full-Moon of Māgh (February), and the Hindus who attend—chiefly Poliyas—go on to worship at this shrine. The priest is a Mālākar, and he is assisted by (1) a *Bārikar* (water supplier), who washes the deities, and whose caste is TĀNTI-GANESH; (2) a Drum-beater; and (3) two *Bhaktas*—all of whom have 2 or 3 bighas of rent-free land from the Churamon Zemindar as payment for their services in the temple, and, in whose families, the offices are hereditary. We did not see either the Drum-beater or the two *Bhaktas*, but the Tānti-Ganesh was a person of strongly Mongoloid features and his water is not taken by the neighbouring Poliyas and Deshis, who, by their appearance, should be of the same stock.

Inside the temple were three or four images, the most interesting being a Trivikrama, with a late 13th century inscription which was read by Babu Sarasi Kumar Saraswati, the Government Research Assistant, attached to the Rajshahi Museum, who accompanied me, as meaning 'The God of the Poliyas'. The Pūjā that is performed in the temple is called *Kañser Brata*, and consists in repeating the *Mantra* quoted below five times, after which offerings of flowers, water, plantains, rice, curd, and *ghi* are made. The Pūjā is done once every week on Tuesdays at noon, without marking the images with vermilion. Marking with vermilion is only done at a special ceremony held at the end of each year.

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[1] This Tank measures 1,320 yards by about 400 yards, and is therefore larger by 7 or 8 per cent. than the Garh Dighi of Bairhāṭṭā.

Mantra.

ঘঙ্গট মঙ্গট শীবের ঘরাণী বদে যাও
বদে আইস বদে ঠাকুরাণী
আমার হাতে নয় ফুলপানি।

'The wife of Śiva with veils
(on her head), Bade Ṭhākurāṇi.
Go Bade and come Bade. She takes
flowers and water from my hand.'

From the *mantra*, it may be inferred that the true name of the temple should be *Satikā Devī Thān*, as evidently the goddess addressed is the wife of Śiva and not Śachī, the wife of Indra.

Three miles to the west is a large *bil* called Kanchan *Bil*, and this is said to be the site of Rājā *Mardanābha's* capital, which sunk under the water owing to his being cursed by his illegitimate grandson Satya Pīr—the story being that Satya Pīr was conceived from the Rājā's daughter, Sandhyābatī, having smelt a flower, and that, in consequence, she was driven away from home when she was found to be with child. Houses and paved roads are seen in the *bil* when it dries up in the summer. There was some difference of opinion among the local people as to the caste of the Rājā, but they all agreed in his having been a great persecutor of Muhammadans. The whole story is given in a *puthi* called *Satyapīr*.

At Srirāmpur, close to Kanchan *bil* on the south, Sarasi Babu found a Kalyāṇasundara image of the 10th century A.D., while just to the north, in Krishnapur, east of the *bil*, there are two Vishṇu images of about the 12th century. In Marail, a village 2½ miles N.W. of Karanji, which has a N. × S. tank measuring 175 × 100 yards, Sarasi Babu came across a fine specimen of an image of Manasā, with a very interesting inscription showing that it was dedicated by a Rānī of the 10th or 11th century: while, on his return journey, he found at Nahet (Niat of the *Mauza* map) 2 miles south of Karanji, another Vishṇu with a short inscription dating from the 12th century. It is therefore certain that this area was in the possession of people professing the Hindu religion from the 10th to at least the end of the 13th century A.D., and it may also be inferred, from the Ganeshpārā temple inscription (as Sarasi Babu has pointed out in his first paper), that at least at the end of this period, there was—as is still the case—a strong Koch element in the local population. At present Karanji contains no high caste Hindus, and is inhabited by Musalmans, Deshis, Poliyas, Bhuimālis, Vaishṇavas, and Nāpits, as well as a few families of Tānti-Ganeshs and *Bhaktas*.

From the point of view of clearing up the history of Rājā Ganesh, the facts are not complete enough for us to be absolutely certain as to their interpretation, but at all events they enable

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a probable theory to be advanced regarding him. These facts may be briefly summarized as follows :—

1. The existence of a tradition among the local people at Karanji, that Ganeshpārā (which is certainly an ancient site) was once the residence of a Rājā, whose name was either Ganesh, or Mardanābha (or both).

2. The existence in the immediate vicinity of Ganeshpārā of the temple called *Kaṅs Rājār Thān.*

3. The existence in this temple of an image of Trivikrama Vishṇu with a late 13th century inscription showing that it was the 'God of the Poliyas': with the inference already mentioned that then (as now) there was a strong Koch element in the local population.

4. The employment as washer of the images in this temple of a man of strongly Mongoloid features—belonging to the previously almost unknown caste of Tānti-Ganesh.

5. The use in the worship at this temple of a *mantra* called *Kaṅser Brata.*

6. The local story of the connection of Rājā Mardanābha with the city of Kanchan, now sunk under the water of the *bil* of that name.

One criticism made by a friend when reading the first draft of this paper was that the names Ganeś and Kaṅs could never be confused by any Bengali. The reply to this is (*a*) that apparently here at Karanji they *have* been so confused, and (*b*) that among at least Bengali Muhammadan historians, Ganesh has actually become either Kāns or Kānsi. The explanation that I suggest is that the confusion has arisen owing to the Rājā (whose real name may quite possibly have been Ganeś) having been also, as Col. Dalton suggested, a *Koch,* a word which then (as now) was pronounced Kōns. If the Rājā was a Koch, this would also readily explain the complete failure, up to now, to link him up with any family of Varendra Brahmins (in spite of Babu Durga Chandra Sanyal's charming fairy-tale, making him out to be the chief Bhāduri of Satgara,—now a ruin 6 miles east of where the North Bengal Railway crosses the Atrai river), and the almost similar result in the case of the attempt to make the Rājā a Kāyastha.

I will conclude this paper by putting forward my own reading of the story of Rājā Ganesh, not as something proved, but merely as a possible theory that may lead to further fruitful discussion of the problem.

Ganesh was a Hindu Rājā of Koch descent whose original zamindari was at Karanji. Possibly he had enrolled the local Kochs round his zamindari as *paiks* and trained them into a sufficiently useful militia to enable him to establish himself as a more than ordinarily powerful nobleman under Ghiyāsuddīn 'Azam Shah : or he may have established his authority over the Kochs by offering them—for a consideration—nominal admis-

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sion into the Hindu caste system. As his influence at Court increased, he extended his zamindari southward to include the moated city of Ekdālā-Bairhāṭṭā, where he placed his son Mahendra as Governor, to gather in more Koch recruits from the north and draft them on, when trained, to increase his father's command at Pandua. By the beginning of the 15th century, Rājā Ganesh was playing the leading part in Bengali politics and has even been accused in the *Riyāzu-s-Salātīn* of having treacherously killed Ghiyāsuddīn 'Azam, who died in 1410 A.D. Ghiyāsuddīn was succeeded by his son Saifuddīn Hamza Shah ; but when the latter died after a reign of only two years and an adopted son of Saifuddīn, named Shihābuddīn Bāyazīd, was placed on the throne, Ganesh broke into open insurrection, and after slaying Shihābuddīn, began himself to rule over Bengal. The existence of coins of Alāuddīn Firuz, son of Shihābuddīn, indicates some degree of opposition to the Rājā, but, by the middle of 1414 A.D., Alāuddīn had disappeared, leaving Rājā Ganesh *de facto* King of Bengal, though apparently he did not then strike any coins. Conflict however with Nūr Qutbu-l-'Ālam, regarding the Rājā's oppression of Moslems and slaying of Moslem saints, led to the invasion of Bengal by Sultan Ibrāhīm Shah of Jaunpur, and the replacement of Rājā Ganesh by his converted son Jadu, under the Moslem regnal name of Jalāluddīn. This occurred, as may be gathered from the date of Jalāluddīn's first coinage, in 1415 A.D. Owing to Nūr Qutbu-l-'Ālam having died at the beginning of 1416 (7th *D̲h̲i-l-Qa'dah* 818 A.H. : *cf.* Beveridge, *J.A.S.B.*, 1892, p. 124), Rājā Ganesh attempted to reconvert his son to Hinduism, but, failing in this, he himself seized the throne and struck coins in both 1416 and 1417 under the title of Danuja Marddana. Jalāluddīn however, though in prison, had not forgotten that he had been crowned King of Bengal by Nūr Qutbu-l-'Ālam, and, taking advantage of his father's increasing unpopularity, owing to the Rājā's fanatical oppression of Moslems, he successfully arranged with his friends outside for Rājā Ganesh's assassination. This probably took place towards the end of the year 1417. The Hindus were still strong enough in Bengal to appoint Jalāluddīn's brother Mahendra as successor to his father,—Mahendra's mother, the Rānī of Baigungaon, possibly taking some part in the way of supplying the necessary funds—and coins of both Jalāluddīn and Mahendra, struck in 1418, are known. After the end of this year, however, the coinage of Mahendra comes to an end, and henceforward (until his death in 1431) Jalāluddīn was evidently undisputed Lord of Bengal.

If this be the true story, what practically amounts to a Koch invasion of Bengal from the North (repeating the invasion of the Kambojas in the 10th century) could not have been looked upon with any favour by either Muhammadans or

Hindus, and if, as is probable, Jalāluddīn was content to rely on Bengal troops, he is not likely to have had much difficulty in persuading his subjects that he was determined to keep Bengal for the Bengalis, and in combining all classes in crushing his brother and driving the Koch levies back north into the territory of the Khyen Kings of Kamatapur. Memories of the struggle may even have supplied Husain Shah at the end of the 15th century with a valid pretext for invading the Khyen dominions, and, after the capture of Kamatapur by a ruse and the incorporation of Nīlāmbar's kingdom in Bengal, establishing Ekdālā as his seat of government, in preference to Pandua, with its sad memories to a Moslem of the ruthless murder of saints and the desecration of the Adīna Mosque by its conversion, at Rājā Ganesh's order, into a zamindari office.

Note.—The references in Section B. of this paper to Ziya Barani's account of the first invasion of Bengal by Firuz Shah are to a translation of the relevant passages in the *Tarīkh-i-Fīrūz Shāhī* by Dr. Shahidullah, published as Appendix II to N. K. Bhattasali's *Coins and Chronology of the Early Independent Sultans of Bengal* (Heffer, 1922).

For Shams-i-Sirāj Afīf's account of both invasions *vide* Elliot and Dowson's *History of India as told by its own Historians*, Vol. III, pp. 293–298 and 305–312.

ARTICLE No. 7.

Notes on Two Tours in the Districts of Māldah and Dinājpur.

By S. K. SARASWATI.

In the course of the last three months (December, 1932, and January and February, 1933) I have had the privilege of undertaking two tours through some ancient sites in the districts of Māldah and Dinājpur—one during the Christmas holidays in the company of Mr. H. E. Stapleton, Director of Public Instruction, Bengal, and the other at his instance during the following month. These tours, though necessarily hurried, furnished me with opportunities of visiting places of archæological and historical interest and of examining rare and unique materials for the study of the antiquities of this part of Varendra.

These tours covered the north-eastern part of Māldah and the south-western of Dinājpur, roughly the stretch of land between the rivers Mahānandā and Punarbhavā (*Apunarbhavā* of Sanskrit texts), comprising the western half of ancient *Varendrī*, whose traditional boundaries are the Mahānandā on the west and Karatoyā on the east. They covered a distance of some 50 miles from Pandua to Dinājpur along the Māldah-Dinājpur road, which closely follows the alignment of the old embanked road of Ghiyāsuddīn from Gaur to Devīkoṭ up to Banshihārī, whence the old road turns eastward for Devīkoṭ. The country that was traversed contains the remains of many ancient settlements with innumerable old tanks and ruins of forts, temples, and palaces, signifying the importance of the area in days gone by.

PANDUA.

The monuments that still survive, and the long line of mounds, strewn with bricks along both sides of the road throughout the whole length of the city, testify to the past glory of this old capital of Bengal, with its 20 miles of fortification around it. The principal remains lying, with a few exceptions, by the side of the Māldah-Dinājpur road, may be divided into those of Pandua and Adina, the distance between the two places being about two miles. Those at Pandua consist of the *Āstānahs* or *Dargāhs* of the Baishazāri and Shashhazāri endowments (known respectively as *Bari Dargāh* and *Chhoti Dargāh*), the Qutb Shāhi, or Golden, Mosque, and the Eklakhi Mausoleum. At Adina are the great Adina mosque and, at a distance of a mile to the east, the ruins of the palace at Sataisghara. So many writers have, again and again, dwelt on these monuments that anything more than this mere enumeration may be thought superfluous.

What I want to lay special stress on is that Pandua, before the Muhammadans established their capital there, was a flourishing Hindu City, its earlier name, *Pāṇḍunagara*, being preserved in the coins of the Hindu kings, Danujamarddanadeva (Rājā Kaṅs) and Mahendra, issued in 1417 and 1418 A.D. Over 120 years ago, a local story was given to Dr. Buchanan-Hamilton that Pandua owed its foundation and name to a Rājā belonging to the Pāṇḍava family of Delhi, who came to, and remained in, Bengal for sufficient time to found a new city there.[1] This tradition of Pāṇḍava connection also extended to some ruins of the city, and we have the local stories of Sataisghara *dighi* being excavated by Arjuna, the third Pāṇḍava, and the building immediately to the south-east of the tank, being called *Pāṇḍap Rājā Dālān.*[2] Popular tradition in this country foists well-known names of mythology on different places of antiquity, thus endowing everything of old with a veil of mystic sanctity. Whatever the significance of these legendary tales, there is no doubt that they generally point to a remote antiquity of the places to which they are attached.

The excavation of 'Tanks as deep as the bottom of the sea' and the erection of 'Temples as high as mountain peaks'[3] are the greatest merits of a Hindu aspiring to fame and renown in this world, and Paradise in the next; hence no man, who could afford it, was slow to acquire such merit by the excavation of tanks and the erection of temples. As such, they may be regarded as undying testimonies of a prosperous Hindu settlement where they occur. There is no dearth of tanks in and around Pandua. Practically the whole region is studded over with tanks, large and small, nearly all of which, with their greatest length from north to south, point to their Hindu origin. The existence of lofty temples may be incontestably proved by the numerous Hindu remains, both architectural and sculptural, which still exist at Pandua,—some lying loose, and others built into the Adina Masjid, the Eklakhi tomb, the buildings around the shrines of Nūr Qutb Alam and Shah Jalāl, and even into the arches of the old bridge on the road to the south of Pandua. Indeed, every structure of this royal city discloses Hindu materials in its construction, thus indicating that no earlier monument was spared. An examination of the stones used in the construction of the Adina mosque (one of them bearing a Sanskrit inscription recording merely a name, *Indranātha*, in characters of the 9th century A.D.), and those lying about in heaps all around, reveals the fact, which no careful observer can deny, that most of them came from temples that once stood in the vicinity.

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[1] Buchanan-Hamilton, *Dinajpur*, published by the Asiatic Society of Bengal, 1833, p. 48.

[2] Abid Ali Khan and Stapleton, *Memoirs of Gaur and Pandua*, p. 143.

[3] Cf. *Toyāśayair=jjaladhimūlagabhīragarbhair=*
Ddevālayaiś=cha kulabhūdharatulyakaksaiḥ |
Vikhyātakīrttir=abhavat................
V. 7 Bangarh grant of Mahīpāla,
Maitreya A. K., *Gauḍalekhamālā*, p. 94.

In many cases these Hindu materials were possibly not taken from distant edifices, but are still *in situ*. The plinth mouldings of the mosque have striking similarities with those of the *jaṅghā* of a Hindu temple. Their regular construction, each in its exact place, such as we find in Sikandar's chamber and in the base of the wall to the north of it, inclines the writer to endorse the opinion of Saiyad Ilahi Bakhsh, the author of the '*Khurshīd-i-Jahān Numā*', that on this very spot stood a Hindu temple[1] (left unfinished perhaps on the approach of the Muslims), which Sikandar Shah decided to convert into a mosque with the materials lying ready to his hand. The bigger plan of Sikandar necessitated, however, an extension of the plinth towards the south where some irregularities in construction occur, due probably to the ignorance of Sikandar's masons of Hindu architectural details.

A study of every Muslim settlement of some antiquity reveals the story how they all sprang up on and around earlier sites from which convenient materials were available to build and decorate structures of another age and of another faith. The ancient city of Devīkoṭ (*Koṭīvarsha* of the Sanskrit inscriptions) was levelled to the ground in the early days of the Muslim rule to build up the Diw-kot or Dib-kot of the Muhammadan historian. Such was also the story of Gaur, of Mahāsthān, and practically of every Muhammadan establishment which we so frequently find perched on ancient mounds. Pandua was no exception to this general rule, and what little evidence we still have of this Hindu city calls up a vision of its ancient magnificence, with temples thronged with worshippers and tanks smiling with lotuses.

RAI-K̲HĀN DIGHI AND MOUNDS IN THE NEIGHBOURHOOD.

Some 5 miles due north-west of Pandua there is a large north and south tank, one of the largest in the region, named *Rai K̲hān Dighi*. A little to its west are two mounds, of which one is purely a heap of earth. The other, composed of bricks, has a moat all around, with only one way of approach and that in the direction of the earthen mound. These mounds were discovered in the course of the Air Survey of Māldah, and the annexed drawing (Pl. 5) is made from an air photograph by kind permission of Capt. Raynham. Local tradition connects the mounds with Dhanā and Manā, two robber brothers, who used these eminences to watch for their victims. Two similar mounds, with a similar story, known as *Lātu Pātur bhiṭā* also are said to be found on the other side of the river Mahānandā just beyond the Pirgunj bridge. It seems that these mounds represent a fortified post guarding the Pirgunj ferry and the military road running to the south-west.

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[1] Saiyad Ilahi Bakhsh, *J.A.S.B.*, 1895, p. 211.

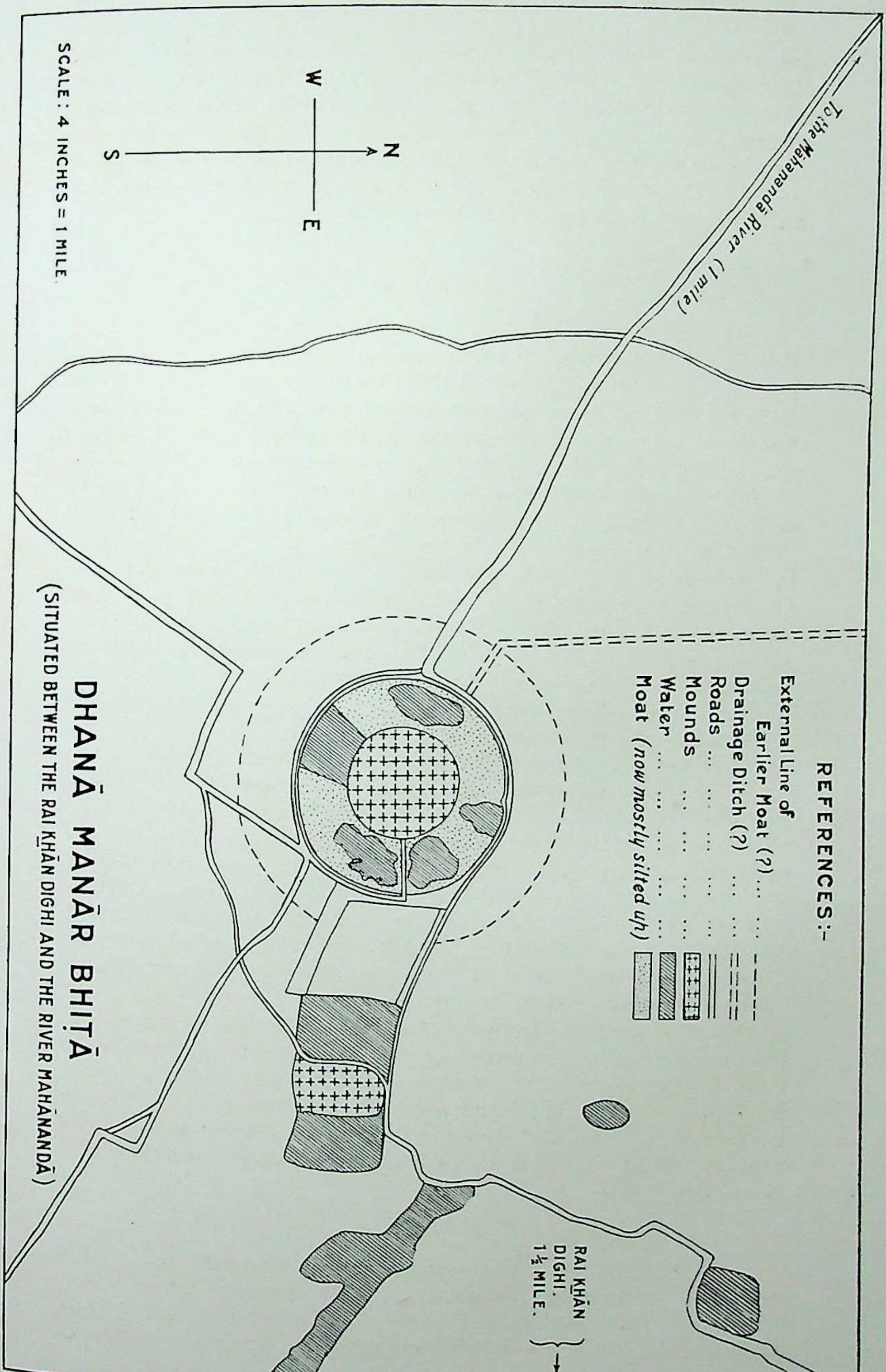
RĀNĪGARH.

At Rānīgarh or Rānīgunj, some 7 or 8 miles due east of Panḍua, at a sharp southward bend of the river Tāngan (*vide* Pl. 3 in this volume), there exists a ruined masonry bridge over a former course of the river, connecting two sections of a ruined Bādshāhī road, one of which came from the east while the other ran southwards. Mr. Stapleton identifies this spot with the site of the battle between Sikandar and his rebellious son, Ghiyāsuddīn, in which the former lost his life. A *pucca* brick-on-edge road runs west-north-west from Rānīgunj and, passing through the *mauzās* of Barabari, Pathimari, Chhaighati, Parahar, and Homadighi, reaches, most probably in the end, the palace at Sataisghara. This road enters Pandua through a gate in the eastern wall at a place called Bilaikandar in *mauza* Parahar. Just inside, the road is in excellent preservation with a breadth of as much as 51 ft., and is well worth conservation by the Archæological Department.

Traces of Hindu remains too are not wanting at Rānīgunj. In the market place may be seen several fragments, of which two deserve notice. The first represents the fragment of a pillar capital with 'āmalaka and foliage' design. It evidently belonged to some pre-Muhammadan structure that stood near by. From its similarity with the capital of the Bangarh pillar, now in the Dinājpur Rāj garden, in design and execution, it can be tentatively dated in the 10th century A.D. The other, a sadly mutilated deity in two fragments, shows the eight-handed goddess Durgā slaying the Buffalo Demon, issuing out of the body of the animal. The execution is vigorous and the actual fight—completed with the help of her two main hands—one seizing the demoā by his hair and the other thrusting the trident through his breast—is very finely portrayed. These and other similar stones reported from the vicinity, point to a Hindu past of considerable antiquity for Rānīgunj.

DEOTALĀ.

At Deotalā, 15 miles to the north of Pandua on the high road to Dinājpur, stands another shrine (*chillākhāna*) connected with the sacred name of the famous saint Shāh Jalāl Tabrīzī, on account of which the place was also known as



W
N
E
S
SCALE : 4 INCHES = 1 MILE.
To the Mahānandā River (1 mile)
REFERENCES:-
External Line of Earlier Moat (?) ... ---
Drainage Ditch (?) ... ═ ═
Roads ... ... ═
Mounds ... ... ⊞
Water ... ... ▨
Moat (now mostly silted up) ... ░
RAI KHĀN DIGHI. 1½ MILE.

DHANĀ MANĀR BHIṬĀ

(SITUATED BETWEEN THE RAI KHĀN DIGHI AND THE RIVER MAHĀNANDĀ)

Qaṣbah Tabrīzābād, as can be gathered from the inscriptions found *in situ*[1]. Deotalā (from the Sanskrit *Devasthala*—the abode of god) evidently implies an ancient Hindu settlement, a fact corroborated by the tanks scattered through the jungles and the Hindu remains found at the shrine. Cunningham found a fine image of Vishṇu at the site[2] and several Hindu pillars are still to be seen within the enclosure. A door-frame to the east of the Chillākhāna shows a trident (the emblem of Śiva) in the centre of its lintel. Another lintel, with the figure of a Ganeśa on it, is partly embedded in a mound to the east of the road. Indeed, the whole site consists of undulating elevations, full of brickbats and potsherds, which, when excavated, may disclose interesting materials for the history of this 'abode of god'.

PĀTHARGHĀṬĀ.

About 8 miles to the north of Deotalā, Pātharghāṭā on the river Bāliyā, with huge blocks of stones scattered about on both the banks, and massive pillar foundations in the bed of the river, shows that here a stone bridge was thrown across the river to connect the two sections of the old road.

BANSHIHĀRĪ.

Four or five miles further on towards the north-east, we reach the right bank of the Tangan where, scattered over a considerable distance, are found many large blocks of stone—most of which show sculptured figures and decorations. Possibly they were carried down from Ekdālā (*vide* next section) to throw another bridge over the Tangan, but the project remained unrealized for some causes not known. On the other side of the river is the *Thānā* of Banshihārī in the compound of which we noticed some interesting sculptures collected from the vicinity. The most interesting is an image of 'Lakshmī-Nārāyaṇa', so rare that Mr. N. K. Bhattasali claims a Dacca specimen as the only one of its kind found in Bengal.[3] In the present tour we were fortunate to find two such images, the second one being worshipped in a village shrine at Marail. The composition closely resembles the 'Umā-Maheśvara' group, so frequently found in Bengal. The lord 'Nārāyaṇa' is seated in *lalitāsana* (with his right leg pendant) on a lotus seat, with his consort seated on his left knee. His four hands hold, clockwise, *śaṅkha*, *padma*, *gadā*, and *chakra*, the last hand also encircling the body of 'Lakshmī' whose right hand is placed round the neck of her lord, the left holding a lotus by the stalk.

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[1] For an account of Deotalā and its inscriptions reference should be made to Abid Ali Khan and Stapleton, *op. cit.*, pp. 167–171.

[2] *A.S.R.*, Vol. XV, p. 95 and pl. XXVII.

[3] Bhattasali, N. K., *Iconography of Buddhist and Brahminical sculptures in the Dacca Museum*, p. 88 and pl. XXXIV.

Another image, that of 'Padmapāni Avalokiteśvara' discovered from a tank at Pundri, some nine miles south-west of Banshihārī, was presented to Mrs. H. E. Stapleton by the Banshihārī M.E. School Committee and has now been presented by her to the Museum of the Varendra Research Society, Rajshahi. The statue, which is in an excellent state of preservation, shows the god seated in *lalitāsana*, the right hand in the *varadamudrā* and the left resting on the thigh, holding a lotus by the stalk (*sanālapadma*). 'Amitābha,' his spiritual father, is seated in meditation just in front of his matted tiara (*jaṭāmukuṭa*). The base is quite plain but for the inscribed Mahāyāna creed, and this is also the case with the back slab, except for two *pūrīta* motifs on the throne back, and a miniature stupa on either side of the oval halo. The paucity of ornaments on the back slab, the rounded stela, the incised folds of the cloth, and the easy and graceful pose combined with a not-too-slender form enable us to ascribe the sculpture to the ninth century A.D., a date also substantiated by the characters of the inscription.

An image of 'Manasā', the popular Snake goddess of Bengal, shows the goddess seated in *līlāsana*, with a hood of seven cobras over her head. The left hand holds a snake while the right shows *Varada*. The breast band and the third eye on forehead are peculiarities worth noticing. The date seems to be circa 13th century A.D. (Plate 6, Fig. 3).

EKDĀLĀ.

Mr. Stapleton's study *in situ* has confirmed the theory of Mr. E. V. Westmacott[1] that the site of the city of Ekdālā, before which Ilyās Shah and Sikandar Shah, in the middle of the 14th century A.D., successfully beat off the attacks of the Emperor Firuz Shah of Delhi, and which, 150 years later, was the favourite residence of Husain Shah, should be identified with Bairhāṭṭā, between the rivers Chirāmatī and Bāliyā and enclosed on north and south by east and west canals joining the two rivers (*vide* Pl. 4 in this volume). The Hindu antiquity of the place is certain from the images, as well as the N × S tanks still to be found within this enclosure. The earliest image, so far known from the site, was found at the south-east corner of *Kāka dighi*, a north and south tank, where can be seen the plinth of a temple with a 'Liṅga' still *in situ* and numerous other fragments scattered about (Pl. 6, Fig. 1). The image in question, that of 'Vishṇu' (Pl. 7, Fig. 1) stands on a low plinth with four hands, all hanging down, the normal two hands with attributes, and the additional ones placed on the heads of two attendants standing on either side. In style and execution it closely resembles the image of Vishṇu on the Bodhgaya stone dedicated in the 26th year of Dharmapāla,[1] on which account the present specimen may be dated *c.* 800 A.D. A small head (Pl. 6, Fig. 2), probably a little later in date, picked up from among the fragments on the site, is remarkable for the peaceful aspect of the eyes and face which indicates the head as that of a 'Yogin', a theory also substantiated by the *jaṭāmukuṭa*. The fragments range in date from the 10th to the 12th centuries A.D., and a seated image of 'Sūryya' (dating from the 13th century—*vide* previous paper) was collected by Mr. Stapleton two years back from Qaṣbah which is close by. All these point to Bairhāṭṭā as having been a flourishing Hindu settlement from the 8th to the 13th centuries A.D.

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[1] *J.A.S.B*, 1874, p. 244-45.

At Brajaballabhpur, a little to the east, there are preserved in the Kutchery of the local zamindar several images which are worth noticing. One represents the lord 'Nārāyaṇa' (*śaṅkha*, *padma*, *gadā*, and *chakra*, clockwise, in his four hands) with his usual attendants. The pedestal bears an inscription of two lines—

L. 1. *Lakshmī-Sarasvatīnāthaḥ* ||
L. 2. *Paṁdutha-devasya muktaye* ||

The first line refers to the deity as the lord of 'Lakshmī' and 'Sarasvatī'. The second gives the name of the donor—*Paṁduthadeva*—for whose salvation the image was dedicated. The characters of the inscription, as well as the style of execution and decoration of the image, suggest a date in the 12th century A.D. A fragment of about the same date—representing a very spirited '*Gaja-simha*' (2′ 6″ in height), which served as a side decoration of an image—gives us an idea of the colossal size of the image to which it originally belonged.

MAHĪPĀL DIGHI.

This enormous tank, about a mile in length, by the side of the Māldah road about 18 miles south-west of Dinājpur, calls up a memory of Mahīpāla, the popular Pāla king, who recovered Varendra from the hands of usurpers about the end of the 10th century A.D. Nearby, we were told, is the village of *Pālsahar* (the city of the Pālas). On the eastern side of the dighi there are several images now used as stepping stones in the huts of non-Hindu inhabitants.

KARANJI.

About four or five miles to the North-west of *Mahīpāl dighi* is the large *mauzā* of Karanji. The manuscript of a poetical work, named '*Haricharita*' by Chaturbhuja found in the Durbar Library, Nepal, states in the colophon that *Karanja*, the foremost village in *Varendrī*, inhabited by Brahmins, well-versed in the Śāstras, was granted to '*Svarṇarekha*' the best Brahmin, by King Dharmapāla.[1] The similarity of names is tempting, but there is grave doubt regarding the identification of Dharmapāla's *Karanja* with this Karanji. So far as our present knowledge goes (*i.e.*, pending the excavation of two mounds in the village called *Bheṇḍulā Ḍhipi* and *Haṭkholā Ḍhipi* the latter known also as *Deulāni*), there are no remains which can lead us back so far as the time of Dharmapāla. At present Karanji contains no high caste Hindus, being now inhabited by Poliyas, Deshis, Mussalmans, etc. and this seems to have been the case in earlier times too. A strong Poliya and Deshi element as far back as the 13th century may be inferred from an image of Trivikrama, which, according to the inscription on the pedestal, was dedicated by (or for) the Poliyas. Unfamiliar names in earlier inscriptions from near about also point to this element still earlier.

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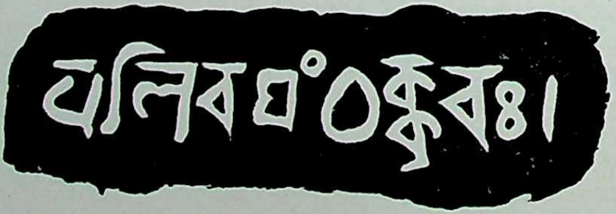
[1] *A.S.I.*, *A.R.*, 1908-09, p. 148, fig. 3.

A quarter of a mile or less from the *Haṭkholā* is a spot called *Ganeśpārā*, to the west of which is a half ruined temple, known as *Sachikā Devī Thān* or *Kaṅs Rājār Pujār Thān* (place of worship of Rājā Kaṅs, i.e. Ganeś). *Ganeśpārā* and *Kaṅs Rājār Pujār Thān* lend support to the local tradition in the District of Dinājpur that Karanji was the native village of Rājā Ganeś. Inside this temple, among other images and fragments of images, is an image of Vishṇu (Trivikrama) with his usual attendants. The pedestal bears an inscription:

Palirayaṁ Ṭhakkuraḥ |

which, if corrected to '*Palerayaṁ Ṭhakkuraḥ*', means the 'God of the Palis' (Poliyas), meaning thereby that the image was dedicated by (or for) the Poliyas. Palæographical reasons ascribe the sculpture to the latter part of the 13th century A.D. (Pl. 7, Fig. 2).



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[1] *Catalogue of palm-leaf and selected paper Mss. in the Durbar Library, Nepal*, MM. H. P. Sastri, p. 134.

The pedestal of an image of Vishṇu from the village of Nahet close by bears an inscription which most probably reads:

Dānapati adet.

It seems that the correct form of '*adet*' is '*adadāt*' i.e. the donor gave it, or more likely '*adāt*,' meaning the donor (himself) carved (it). The writing appears to date from the 12th century A.D.

MARAIL.

At Marail, about 2½ miles further to the north-west, there are several sculptures preserved and worshipped in the village shrine. The one, a 'Lakshmī Nārāyaṇa' (mutilated), we have noticed previously. The other image of note, a 'Manasā', is an excellent example of the representation of the snake goddess in Bengal. The details correspond to those of the Banshihārī specimen, but the execution is much earlier—probably 10th–11th century A.D.—a date which seems also to be corroborated by the inscription on the pedestal:

Bhaṭṭiṇī(nī) Maṭṭuvā |

which evidently gives the name of the donor. '*Bhaṭṭinī*', according to *Amarakoṣa*, means an unanointed wife of a King (*akṛitābhishekā rājapatnī*). *Maṭṭuvā*, who dedicated the image, was thus a queen, though not the chief one, of an unnamed King.

An image of Vishṇu (Trivikrama) collected from Ghaṇaśyāmpur near Nekmarddan by the Pandit of a school at Marail and, later on, presented by Maulvi Tafazzul Hossain (Sub-Inspector of Schools, Sadar, Dinājpur) to the Varendra Research Society, has an inscription at the base. It seems to read:

Vasathava |

which most probably stands for Vāsudeva, a name of Vishṇu.

ŚRĪRĀMPUR.

Among the many sculptures lying at the village shrine of Śrīrāmpur, a mile or so to the west of Karanji, that of 'Kalyāṇasundara' or the image depicting the marriage of 'Śiva' and 'Pārvatī' is worth more than a passing notice (Pl. 7, Fig. 3). Here the god 'Śiva', with tiger skin and *jaṭāmukuṭa*, is seen actually taking the right hand (the *pāṇigrahaṇa* observance of the marriage) of the goddess 'Pārvatī', standing to his right. His other three hands hold a trident, a cup, and a rosary. Pārvatī's left hand hangs by her side. The *urddhaliṅga*, symbolising the celibate 'yogī', should also be noted. The figure with three visible heads on the pedestal, just behind the fire, represent 'Brahmā' performing the nuptial *homa*. Śiva's bull and the donor couple also appear on the pedestal. From stylistic data the image may be dated in the 10th century A.D. An almost similar representation of the scene was found at Hili (Bogra) and is now preserved in the Dacca Sāhitya Pariṣat collection.[1] A big bust of Sūryya and a miniature image, representing a bearded figure with both hands held to the breast and hair tied in a peculiar knot over the head, are also worth mentioning.

KṚISHṆAPUR.

The adjacent village of Kṛishṇapur, on the eastern side of the Kāñchan *bil*, represents an ancient settlement with brickbats and potsherds strewn all over its surface. Large bricks (about 8″ square) may be seen scattered about in and around the village and people say that they can be had in plenty by a little digging very near the surface. The village shrine, known as *Kālir Thān* (the place of the goddess Kālī), is a mound, with brick walls and staircase lined with stones still traceable in the south. The bricks here generally measure 8″ square. A '*Liṅga*' with '*Yonipīṭha*' can still be seen at the top of the mound. Among other stones at the place may be mentioned two black-basalt images of 'Vishṇu' (*c.* twelfth century A.D.)—one of 'Nārāyaṇa' and the other of 'Trivikrama'.

DINĀJPUR.

Every antiquarian who visits Dinājpur dwells at length on the magnificent architectural pieces removed from Bangarh to the palace at Dinājpur by Mahārājā Rāmnāth. I will therefore refrain from any account of these, for which I refer to earlier writers,[2] and will only complete the description of the Rāj collection by mentioning an image lying uncared for under a mango tree to the south-west of the garden. It represents a rare iconographic specimen—'Danturā' a form of 'Chamuṇḍā' —the only other known image of this kind, from Atthasa (Burdwan), being preserved in the Museum of the Vangīya Sāhitya Pariṣat. Unfortunately I was unable to get the necessary permission to photograph this marvellously executed piece of sculpture. The emaciated goddess sits almost in three-quarter profile with her left knee nearly touching the ground and the right raised up. She has both of her hands placed on their corresponding knees, a peculiarity enjoined by the Śāstras.[3] The back slab shows flames, and the pedestal, besides a horse and the image of the donor, an inscription of about the 11th century, partially legible:

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[1] Bhattasali, N. K. *Op. cit*, p. 123, and pl. XLVIII.

[2] *A.S.I., A.R.*, 1921-22, p. 84, and 1925-26, pp. 113-114, and also *V.R.S. Monographs*, No. 4, pp. 29-30 and pls.

[3] Cf. '*Danturākshemakārī syād=bhūmau jānukarā sthitā*', *Agni Purāṇa*, 50, 27.

Śrī Chandra Ka....

The rest is broken away.

Near the palace, in the house of Babu Krishna Kinkar Bhattacharyya, among other images fixed to the walls of his family shrine, is found a magnificent image of a dancing 'Ganeśa' (Pl. 7, Fig. 4). The image, which is a pleasing specimen of the art of the 12th century A.D., shows the eight-handed god dancing on the back of his vehicle, the rat, who also heartily enjoys the dance with upraised head and tail. Of special artistic importance is the rhythmic disposition of the normal two hands, the left outstretched pointing to the upraised leg, and the right held in *abhaya*.

The temple of Mahishamarddinī at Dinājpur, according to an inscription fixed on its wall, was built by the queen of Rājā Ramānāth in the Śāka year, 1668. In the courtyard are two huge sandstone images of 'Varuṇa' and 'Yama', each on his vehicle and with his respective attributes, said to have been removed from Bangarh. The figures, though much worn, seem, from the point of view of style, to be of a fairly early date, and apparently once adorned some temple in the famous city of Bangarh as *Dikpālas*. Inside the temple there is an image of the Buddhist goddess 'Vāgīśvarī', with six of the eight hands showing various weapons, the normal right held in *Abhaya* and the corresponding left engaged in drawing out, with a pair of tongs, the tongue of the demon, shown in agony on the pedestal. A lion also appears on the pedestal as the vehicle of the goddess, and, most probably on this account, the image is being worshipped as 'Bhadrakālī'—a form of Durgā, who has also the lion as her vehicle. This shows how Buddhist images, when their real significance had been lost, were later on taken into Hindu shrines.

March 9th, 1933.

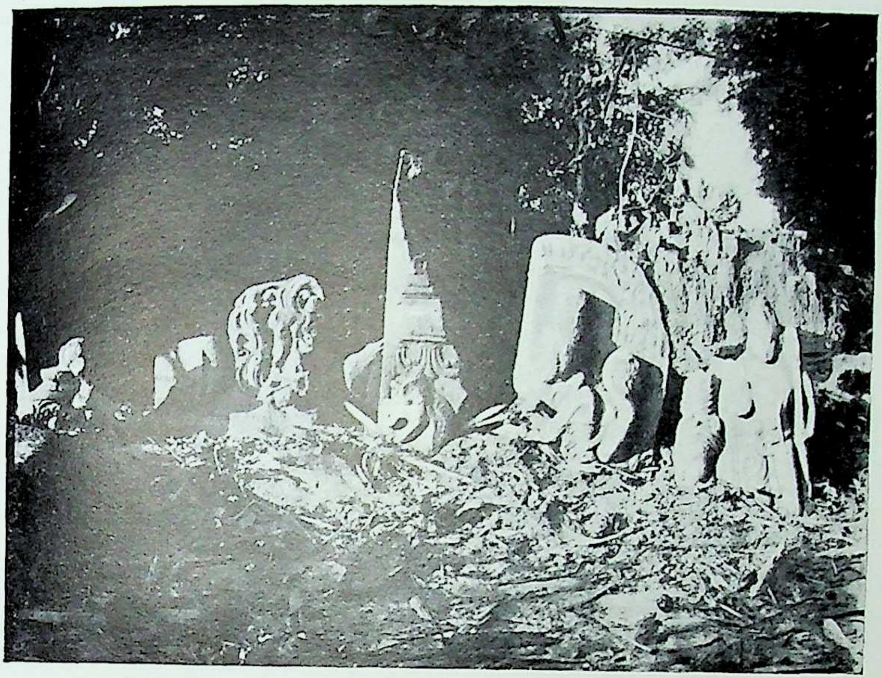

FIG. 1. Fragments—Kākadighi.

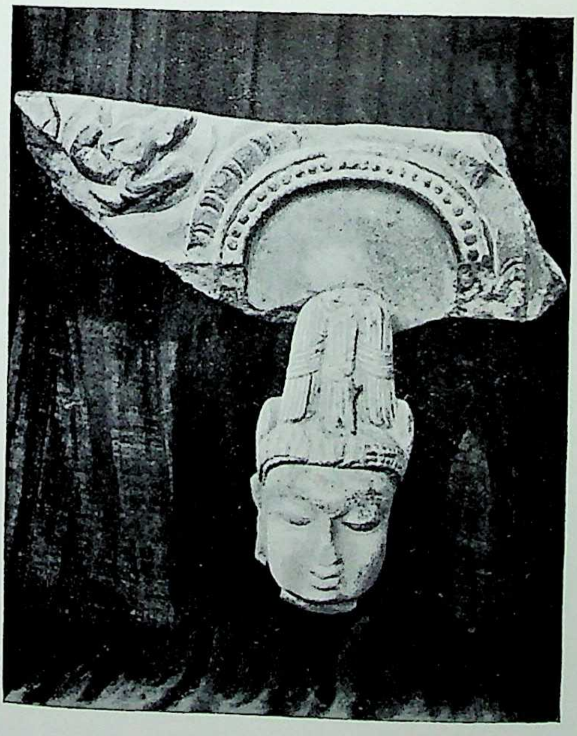

FIG. 2. Small head—Kākadighi.

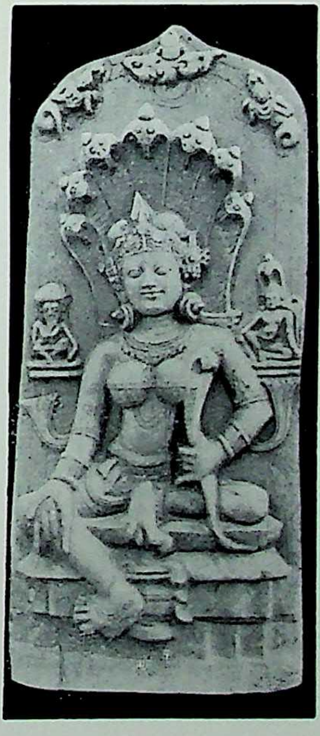

FIG. 3. Manasā—Banshihārī.

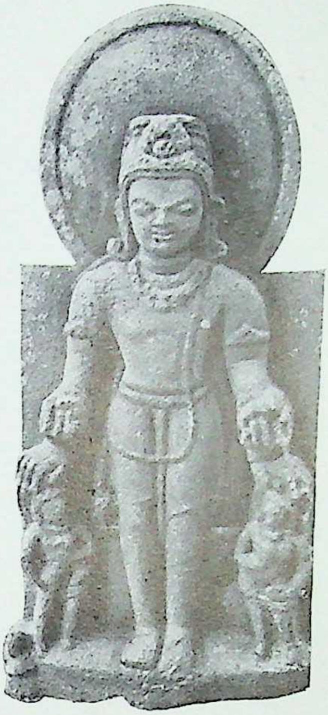

FIG. 1. Vishṇu—Kākadighi.

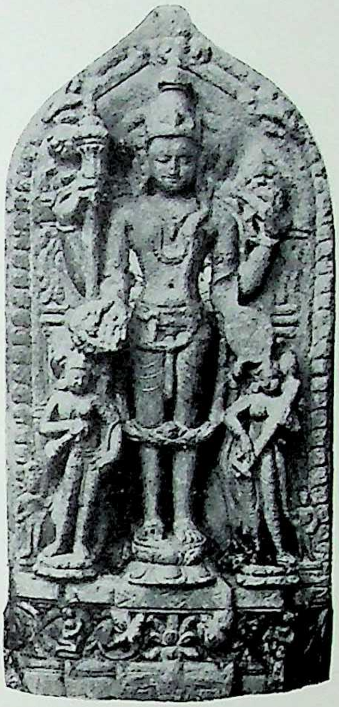

FIG. 2. Vishṇu—Karanji.

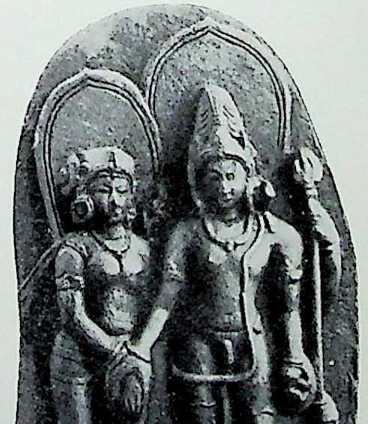

FIG. 3. Kalyāṇa Sundara—
Śrīrāmpur.

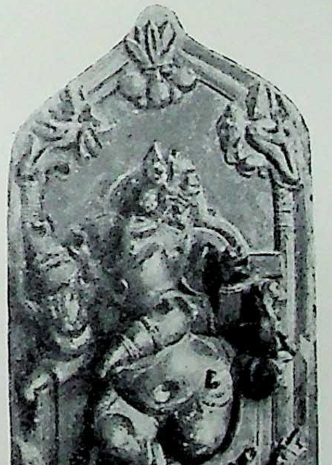

FIG. 4. Dancing Ganeśa—
Dinājpur.

ARTICLE NO. 8.

Notes on a Third Tour in the District of Dinājpur—chiefly along the Chirāmatī River.

By S. K. SARASWATI.

In March, 1933, I was deputed by the Director of Public Instruction, Bengal, to undertake a further trip down the little stream, Chirāmatī, which, after rising from a marsh, a little to the north of Kaliyaganj, runs sluggishly through the south-western part of Dinājpur to just inside the Māldah District. The trip, though only a very short one, proved eminently successful, as it revealed a further rich field for antiquarian and archæological studies that will be well worth fuller and more exhaustive exploration by experts. Besides proving that the present little stream was, in older days, an important one, fringed on both sides by flourishing settlements, the tour has brought to light, as we shall presently see, several rare images, of which a few are apparently unique.

DAHAROL (DAHARAN OF THE 1″ TO 1 MILE *MAUZĀ* MAP).

I will begin with the small village of Daharol, which lies some 12 miles south of Kaliyaganj Railway Station and is just outside what was probably the N.-W. (Chirāmatī) end of the former Northern moat of the city of Ekdālā (*vide* Pl. 4 in this volume). One of the several interesting fragments, that are said to have been recovered while clearing a small half-silted-up tank in the village, is the lower portion of a sandstone door jamb, at the bottom of which is to be seen a *dvārapāla* (gate-keeper), who stands in a slightly *tribhaṅga* attitude with his weight resting on his left leg, the right being a little bent at the knee. His right hand, which is held to his breast, holds most probably an *akshamālā* (rosary), and the left, in *kaṭihasta* attitude (hand supported at the waist), a *daṇḍa* (staff).

Another fragment, the lower portion of an image, most probably belonged to an image of Chāmuṇḍā dancing upon Mahākāla. The fragment only shows a corpulent male figure lying on his back on the pedestal, with a *jaṭāmukuṭa* (matted tiara), and *trinetra* (third eye), and with the foot of another figure pressed on his breast. The slab at the back, as much at least as is preserved, shows traces of flames encircling the main deity. Five female figures, two on the pedestal and three below, most probably represent five other *mātṛikās* or mothers of the Śākta pantheon. The right one on the pedestal, seated in *lalitāsana* on a lotus seat, with the right hand holding *kapāla* (cup) to her breast and the left having a *triśūla* (trident), may be identified with Māheśvarī, the female energy of Śiva. The left one shows an emaciated goddess in the *arddhaparyaṅka* (one knee drawn up) posture, her right hand holding a *kapāla* and her left holding a trident, passing between the fore-arm and the upper arm, and touching the chin. She is most probably Kṛiśodarī ('She of the Emaciated Stomach') who is distinguished from Chāmuṇḍā in the *Matsya Purāṇa*.[1] The three lower figures represent the three other mothers, the remaining two—most probably represented on the back slab—being lost. The extreme right one with *kapāla* and *śakti* (spear), may be identified with Kaumārī. The central figure, a corpulent female, is most probably Vārāhī, an inference supported by the boar-like appearance of her mutilated face. To the extreme left again appears Vaishṇavī, with a lotus in one of her hands.

In the house of Mr. Jogendra Chandra Guha of Daharol there are also several fragments, said to have been collected from Bairhāṭṭā, which is quite close by, being only four or five miles to the south-east. An image of Vishṇu of the Trivikrama type shows the deity standing on a lotus on a plain pedestal with a female figure holding a flywhisk on either side. From the plainness of the pedestal and of the back slab, the flat modelling, and the flat-topped *kirīṭa* (crown), the image can be dated from the earlier days of Pāla rule (9th century A.D.). Two Makara heads of grey sandstone, now placed by the owner on either side of the image, show the vigour which the gifted artist has been able to impart to this material. A bust of Chāmuṇḍā, and a small fragment exhibiting a spirited *Gajasiṁha* (Lion on Elephant), exhibit masterful execution. Among other fragments there is a slab representing the Nine Planets, with a figure of the pot-bellied Ganeśa standing to the extreme right.

KACHRĀ.

Of the numerous fragments of sculptures lying in the village of Kachrā—which is 1½ miles S.S.W. of Daharol, and just within the former N.-W. boundary moat of Ekdālā—one specimen (most probably the fragment of a panel), which I acquired for the Museum of the Varendra Research Society, Rajshahi, merits more than a passing notice. It shows a four-armed goddess modestly bejewelled, seated in *lalitāsana* on a lotus throne, borne on a *triratha* pedestal with figures of a lion and a demon, whose tongue she extracts with a pair of pincers, held in her lower left hand. The last feature identifies the image as that of the goddess Vāgīśvarī, representations of which are rather rare in North Bengal. The lower right hand is in

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[1] *Matsya Purāṇa*, Chap. 261, verses 34–36.

varada mudrā (granting boons), while the upper right and left hands grasp an *asi* (sword) and *kheṭaka* (shield). The head is mutilated. On either side there is a female attendant with a flywhisk, and the slab behind the three figures shows the back of a throne with a *prabhāmaṇḍala* (halo) behind the head of each figure. From stylistic evidence it may be dated in the latter part of the tenth century A.D., or the beginning of the 11th.

Eshnail.

Some 5 miles to the east of Daharol is the village of Eshnail where, in the village shrine (*gambhīrātalā*), are preserved numerous sculptures both in and outside the small hut known as the *Thān*, i.e. the place, meaning no doubt the place of the god. The sculptures mostly represent the usual deities—Vishṇu, Sūryya, Narasiṁha, Umā-Maheśvara, etc. The coating of milk, oil, and vermilion, which have accumulated through probably hundreds of years, prevented any inscriptions—if there be any—from being found. It was from here that I collected a rare iconographic specimen—Lakshmī-Nārāyaṇa (Pl. 8, Fig. 1)—of which I have noticed two other specimens in my report on the last two tours. The present image, of which the top of the slab at the back has disappeared, exactly corresponds, in general composition and distribution of attributes, to those noted in the last report. (For a *dhyāna*, which I have since come across, reference may be made to Hemādri's *Vratakhaṇḍa*, Vol. I, p. 113.)

Āminpur.

Some three miles further south-east, on the old N × S road running past the east gate of Ekdālā, the village of Āminpur presents the appearance of a dead city of by-gone ages, with its mounds and undulating areas, its half-silted-up tanks, and numerous fragments—both architectural and sculptural—lying about here and there throughout the village. The whole area is strewn over with brickbats and potsherds, and people say that a little digging yields bricks in enormous quantities. Of the numerous images to be found in this village, the two lying outside the cutchery compound are worthy of special mention. One is Chaturmukha Liṅga—a Liṅga with busts of Śiva carved on its four sides—which is very rarely met with; and the other is an image of Umā-Maheśvara, which shows a little difference from the numerous specimens of these images so frequently found in Bengal. Śiva, with *jaṭāmukuṭa*, is seen seated in *lalitāsana* on a lotus seat on the pedestal, below which are to be seen the respective vehicles of the god and the goddess with a worshipper in between. The god has two hands, as contrasted with four in the specimens usually met with, a feature not uncanonical, as the *Matsya Purāṇa*[1] enjoins both four and two hands for the god in the Umā-Maheśvara images. The right hand is in the *vyākhyāna mudrā* (expounding pose), while the left is placed on the shoulders of his consort, who sits, with her face towards her lord, on a separate seat to the left, and not on the thigh of the god as she is usually represented. Her right hand rests on the left knee of Śiva, while the left, with the elbow on her left knee, holds something indistinct. On the back slab, in between the consorts, is seen Śiva's weapon, the trident, while two *Vidyādharas* appear above the rounded stela. The images are not in amorous posture as appears to be the case with images where we find the lord touching the chin and breast of the goddess who is seated on his left thigh. It seems that the idea of the present image is to symbolise the dialogue found in the Tantras in which Śiva expounds various matters to the goddess, who listens to her lord with rapt attention.

KAṬĀSHAN.

Quite close to Āminpur on the south is the village of Kaṭāshan which also shows traces of ancient settlement. It seems that the two villages of the present day formed in ancient times a single large and prosperous town (perhaps a suburb of Ekdālā). Of the numerous relics none calls for special mention except a sandstone image of Danturā (Pl. 8, Fig. 2), perhaps dating from as early as the eighth century A.D., which, as it was lying uncared for, I took away for presentation to the Museum of the Varendra Research Society, Rajshahi. The importance of this goddess I have already dwelt on in my last report in connection with another specimen, now lying uncared for in the Dinājpur Rāj garden. The special importance of the present image consists in its being by far the earliest of the three specimens that have up to now been found. The emaciated goddess, in accordance with the *Agni Purāna*, sits with her left knee pressed to the ground and the right raised. Her right hand is placed on the right knee, while the left hand is placed on the ground. The erect hair and bloodshot eyes add to the fierceness of her mien. In spite of the worn appearance of the stone, the specimen is a marvellously well-executed piece of sculpture.

DEHĀBANDH.

Returning again to the Chirāmatī, I next visited the village of Dehābandh, which lies a mile to the south-west of Kachrā. The village shrine is known as the *Saraswatītalā*, and here I found a sandstone Liṅgam of very rare iconographic character. It is encircled by four effigies of the Devī. These have *jaṭāmukuṭa*

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[1] Chap. 260, verse 12.

(matted hair) and are seated cross-legged in *padmāsana* attitude, with clasped hands held up in adoration (*añjali mudrā*). The collection of the Varendra Research Society also possesses four similar specimens, but as the appropriate *dhyāna* is not yet forthcoming, we have tentatively described such specimens as Liṅgams with four Śaktis, the female figures around Śiva's symbol evidently standing for his female energies. The local cutchery also possesses two colossal images of Vishṇu of exquisitely decorative workmanship, which date from the 12th century A.D., and also a huge pedestal of an image buried under the floor of the cutchery bungalow. The Naib was kind enough to dig it up for my inspection and an inscription was then revealed on one side. It reads *Ardhanārīṣara* (Arddhanārīśvara), signifying that the pedestal belonged to an image of Arddhanārīśvara, a rather rare iconographic specimen, showing Śiva and his consort merged into one body.

PATIRĀJ.

Just on the opposite bank of the Chirāmatī to Dehābandh is Patirāj, now a big village containing several mounds which tradition connects with Kīchak Rājā. In some of the mounds walls can still be traced, and heaps of bricks are found throughout the village. Several fragments of images and architectural stones are still to be found in the village, and numerous others are reported to be lying about 'in heaps' in the neighbouring jungles. A pedestal of an image of Vishṇu (the upper portion lost) contains an inscription in characters of the 12th century A.D., reading *Dānap* [*a*] *ti Śrī Vāsudeva,* i.e. Vāsudeva the donor. Some of the fragments look quite unlike anything hitherto found, but their almost hopeless mutilation renders any satisfactory identification impossible.

ĀDYAKHAṆḌA.

Two miles south of Dehābandh on the eastern bank of the river and quite close to the road to Harirāmpur, is Ādyakhaṇḍa or Rāj Khaṇḍa, which has the appearance of a big ruined city, with mounds full of bricks, interspersed here and there with half-silted-up tanks. Some of these tanks seem to have been originally provided with pucca bathing ghats, remnants of which can still be traced. Raised areas full of bricks on the embankments of some of the tanks imply the former existence of temples on their banks. Architectural fragments of stone are also not wanting in the locality. Quite close to the road, and on the bank of a tank, was seen a pedestal of black stone of which, alas, the main image above the feet is gone. The breadth of the pedestal, about 4 feet, gives us an idea of the size of the image to which it belonged. The antiquity of the place (which lies immediately to the N.-W. of the large *mauzā* of Ekdālā after which the city of Ekdālā was named, and which probably formed a suburb of the city) may be inferred from the fact that a miniature Vishṇu (Trivikrama), hailing from Ādyakhaṇḍa and now in the Museum of the Varendra Research Society, Rajshahi, may be dated approximately in the 9th century A.D. From the appearance of the ruins and from the relics still lying above the surface, it is practically certain that the site would well repay systematic excavation. Kāka dighi in Ekdālā, from which a still older image of the eighth century came (*vide* previous paper), is only two miles distant. It can even be suggested that Ādyakhaṇḍa (the original place) most probably represented the earliest settlement on the Chirāmatī which gradually extended to form the bigger city of Ekdālā.

MĀHĀTUR.

Māhātur, the next village to the south, also represents an ancient site, with brick-strewn mounds and stone fragments in all directions. Quite close by, the present N × S road shows traces of ancient brick-on-edge paving like that found at Pandua. Two magnificent images—one of twelve-handed Chāmuṇḍā dancing upon Mahākāla, and the other of a four-handed Kārttikeya riding a Mayūra,—in the collection of the Varendra Research Society, hail from this place. Both belong to the 12th century.

JAGDALLĀ.

At Jagdallā, a mile to the south of Māhātur, there are further evidences of ancient settlement. Just close to the road is a N × S tank, called *Bāghā Muzrā Dighi*, which has traces of a pucca bathing ghat on each of its four sides. The high embankments are strewn with bricks, and there are three small mounds to the east of the tank known to the people as *Deul* (temple). Bricks may be had in abundance in the mounds, and in one mound can be seen several huge architectural stones, most probably still in their respective places. A sandstone image of Chāmuṇḍā dancing upon Mahākāla is now being used as a washerman's stone at one of the ghats. The image presents several interesting features which we shall note later on in connection with a similar image in the Betnā *Kālībārī*.

MAHENDRA.

Next, to the south, comes the large *mauzā* of Mahendra, which, like Māhātur and Jagdallā, is still included within the moated perimeter of the city of Ekdālā. The numerous mounds and tanks, and innumerable bricks and stones that are to be seen all around, signify the former existence of a big and flourishing settlement, and a walk round the village will convince even a layman that the site was once part of a prosperous city, systematically planned with streets bifurcated by lanes, and houses on either side. There are several mounds of which the most important is the gigantic *Godā Dhūm*, which towers above all the rest. Close by the road is a fairly big square tank known as *Yam Pukhur* (Yama's tank) which has high embankments full of stones and bricks on all of its four sides. Near the south-western corner of the tank there is a colossal image buried under the ground up to its chest. The portion above ground—to the top of the back slab—measures 3 feet approximately and this will give an idea of the gigantic size of the image. The tradition of Yama Rājā is widely current, and the *Godā Dhūm*, according to some, represents Yama Rājā's palace. The most prevalent tradition, however, is that all the neighbouring ruins—those at Ādyakhaṇḍa, Jagdallā, Mahendra, and Surohor (mentioned later)—represent some of the hundred residences of the Rānī of Baigungaon, a place now full of jungle-clad ruins, so the report goes, on the opposite bank of the river. Mahendra is said to be one of her sons who had his residence here.

Of the images and fragments of images scattered about throughout the village and those in the village shrine, one, collected for the Museum of the Varendra Research Society, Rajshahi, represents a previously quite unknown iconographic specimen. The general composition of the image (Pl. 8, Fig. 3) is compatible with the image of Sūryya, so frequent in Bengal. There are the seven horses and the wheel of the chariot on the pedestal, above which are seen all his usual attendants—Daṇḍī, Piṅgala, his two Queens with Ushā and Pratyushā on either side, and Mahāśvetā and the Charioteer Aruṇa just in front. All the figures are booted, as is usual with an image of Sūryya. What makes the image so interesting is his *six hands*, of which the two main ones hold two lotuses by the stalks, just as is prescribed for an image of Sūryya. The other hands show respectively the *varada mudrā* (granting boons) and an *akshamālā* (rosary) to the right, and *abhaya mudrā* (granting security) and *kamaṇḍalu* (a pot) to the left. That the image is one connected with the solar pantheon, there can be no doubt. In most of the *dhyānas* Sūryya is assigned two hands, each holding a lotus, and such representations are met with in abundance in Bengal. A few *dhyānas* however ascribe four hands to him, the additional hands showing the *varada* and *abhaya mudrās*. But, nowhere do we find mentioned an image of Sūryya with six hands, nor with the *akshamālā* and the *kamaṇḍalu* as his attributes. The *Viśvakarmā Śāstra* gives a description of the twelve Ādityas, Sūryya himself being one of them (half way down the list). The present image seems to correspond to Dhātrī, the first Āditya, who is thus described in the *Viśvakarmā Śāstra :*

> *Dakshiṇe paushkarī mālā kare vāme kamaṇḍaluḥ* |
> *Padmābhyāṁ śobhita karā sā Dhātrī prathamā smṛitā* ||[1]

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[1] Rao, *Elements of Hindu Iconography*, Vol. I, pt. 2, Appendix p. 88.

'An image of Dhātrī should have four hands of which the main two should hold lotuses (exactly as in the images of Sūryya) the other right should have a *paushkarī mālā* and that on the left a *kamaṇḍalu*.' Mr. Rao translates '*paushkarī mālā*' as a lotus garland. It may also mean a garland of lotus seeds. Lotus seed being a well known *śāstric* material in the composition of a rosary, it is not unreasonable to assume that '*paushkarī mālā*' here means such a garland, i.e. *akshamālā*. So far our image exactly corresponds to the above description. The only discrepancy, viz. the two hands in addition to the prescribed four, need not seriously handicap us as the *vara* and the *abhaya mudrās*, which these two hands exhibit, are the general attributes of every deity. Our acquisition, therefore, in spite of its six hands, probably represents Dhātrī, the first of the twelve Ādityas, and is perhaps the first iconographic treatment of such a deity, yet discovered.

SUROHOR.

Just on the opposite (western) bank of the Chirāmatī is the village of Surohor, traditionally connected, as I have already said, with the Rānī of Baigungaon, which, again, is two miles west of Surohor. The village shrine at Surohor contains numerous images and fragments. I will, however, take note only of two which prove to be the most interesting of all those found at the site, and which, I am glad to say, we have been able to acquire for the V.R.S. Museum.[1] The first in importance is an image of Ṛishabhanātha (Pl. 8, Fig. 4), the first of the twenty-four Jain Tīrthaṅkaras. We have evidence of the existence of a flourishing centre of Jainism in North Bengal, though Jain relics are rather rare, the only avowedly Jain image previously found being one of the sixteenth Tīrthaṅkara, Śāntinātha, hailing from Mandoil in the district of Rajshahi, and now preserved in the V.R.S. Museum, Rajshahi. The image under review shows a marvellously well executed piece of sculpture in magnificent preservation. The Jina (Tīrthaṅkara, or Arhat) is seated cross-legged (*vajraparyaṅka*) on a *simhāsana*, carried on a *pañcharatha* pedestal, which is divided into two sections, the upper occupied by a wheel flanked by two lions, while the lower has a bull (the distinctive *lāñchhana*, or identifying mark, of this Jina) and a kneeling worshipper. The two hands of the Jina are placed on the soles of his feet in *dhyāna mudrā*. He is completely nude. *Ūrṇā* (mole covered with hair, between the eye-brows), *ushṇīsha* (knob of matted hair), and the wheel marks on his palms and the soles of his feet, are among the auspicious marks (*mahāpurusha lakshaṇa*). Behind the head is the *prabhāmaṇḍala* borne on the top of the back of the throne. On either side is seen a male attendant, with a flywhisk, in slight *tribhaṅga*. Above, on each side, is seen a *vidyādhara* couple in the clouds carrying garlands. An umbrella covers the head of the Jina, on both sides of which are to be seen pairs of hands, sounding cymbals and showering flowers on his head. What make the image peculiarly interesting are the figures of the twenty-three other Jinas arranged in rows of niches, the uppermost ones ending in an *āmalaka* and finials, exactly as in the *śikharas* of the *Nāgara* (North Indian) temples. Each of these figures shows the hands in *dhyāna* pose and has the head canopied by an umbrella. Each has his distinctive *lāñchhana* marked on the pedestal. These symbols tally closely with the list given by Hemachandra in his *Abhidhāna Chintāmani*[1] except in the following cases. The fifth Jina, Sumatinātha, shows an animal instead of a heron (*krauñcha*), the seventh, Supārśvanātha, a lotus instead of a *svastika*, and the fourteenth, Anantanātha, a boar instead of a falcon. These are but minor discrepancies ; and taken as a whole, the image, as supplying us with the whole Jain iconography in a synthesis of stone, must be reckoned as an extremely valuable addition to our iconographic knowledge.

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[1] The Society's thanks are due to Messrs. Gopendra Prasad Sukul and Tara Prasad Sukul, Zamindars, for collecting and presenting the specimens to the Society's Museum.

The other image shows us a unique type of Vishṇu (Pl. 9, Fig. 1)—in striking contrast to the two or three hackneyed types of Vishṇu that we are accustomed to in Bengal. The pedestal bears a twelfth century inscription recording the name of the donor, as well as those of his father and mother. The sculpture presents a deity, wearing a long garland reaching to the knees, with four hands bearing respectively *padma*, *gadā* (held horizontally on a lotus), *chakra* (held vertically on a lotus), and *śaṅkha*. He can therefore be no other god than Vishṇu. In the manner of holding the attributes on lotuses this image corresponds to one other image in the V.R.S. Museum which hails from Kalandarpur in the district of Bogra. The specimen also resembles the Kalandarpur one in having no female attendants and in having a two-armed male figure seated in meditation above the head of Vishṇu, as well as a six-armed dancing male figure below the god's lotus seat. From these features it is evident, as has been shown by Mr. N. G. Majumdar in the case of the Kalandarpur image,[2] that the present specimen represents a conception of the Hindu Trinity, the seated figure at the top representing the god Brahmā and the dancing figure at the bottom the god Śiva. What however adds considerably to the interest of the present sculpture is the seven-hooded snake canopy over the head of Vishṇu, which probably shows that Vishṇu is conceived here as *Ananta*, or the Eternal, the hoods of the snake Ananta being utilized to impart to the god an idea of eternity.

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[1] *Vṛisho=gajo=śvaḥ plavagaḥ krauñcho=bjaṁ svastikaḥ śaśī,*
Makaraḥ śrīvatsaḥ khaḍgī mahishaḥ sūkaraś=tathā |
S'yeno=vajraṁ mṛigaś=chhāgo=nandyāvartto=ghaṭo=pi cha,
Kūrmmo=nīlotpalaṁ śankhaḥ phaṇī siṁho=rhatām dhvajāḥ ||

Abhidhāna Chintāmani, Devādhideva Kāṇḍa,—verses 47-48.

[2] N. G. Majumdar, *A new type of Vishṇu from North Bengal, V.R.S. monographs*, No. 3, pp. 15-17 and pls.

HARIRĀMPUR.

Three or four miles further south, and two miles east of the Chirāmatī river, lies the big village of Harirāmpur. Several images are scattered about the village, but the most important collection appears in a shrine (*Kālībārī*) in the easternmost part of the village, bearing a separate name, that of Betnā. The shrine is a dilapidated brick temple with no pretensions to antiquity. The roof has tumbled down, and among the débris are seen several images which are still worshipped. A sandstone image of Chāmuṇḍā (Pl. 9, Fig. 3), partly buried in the débris, and most probably *in situ*, shows interesting features. The emaciated goddess sits in *lalitāsana* on what is evidently a corpse. She has ten hands, of which eight exhibit the usual weapons, and attributes, such as *kapāla*, corpse, *ḍamaru* (rattle), *asi*, *kheṭaka*, *śūla*, fingers touching the lips, *ghaṇṭā* (bell), etc. But what makes the image so interesting is a severed human bust seen in the background, held by its two hands in the two uppermost hands of the goddess, exactly in the manner of the *gajacharmma* (elephant's skin), that we find so frequently in such images. This feature was also noticed in another image now being used as a washerman's stone in the *Bāghā Muzrā Dighi* at Jagdallā. A miniature sculpture, again, shows the Narttéśvara Śiva, so rare in North Bengal, dancing on the bull, with ten hands—the main two held in rhythm with the dance, and the others grasping his different attributes.

The most interesting sculpture at Betnā is however the image of a female figure in *pratyālīḍha* pose (Pl. 9, Fig. 2), fighting with a host of pot-bellied Asuras, and with a prancing lion between her feet. Evidently the whole theme is an aspect of Chaṇḍikā fighting with the demons. The theme, quite different from the commonly-found representations of *Mahishāsura vadha* (slaying of the Buffalo Demon), is wonderfully vigorous and dramatic. The goddess is fighting with the demons with the various weapons held in some of her thirty-two hands. The main pair hold a *śaṅkha* (conch), the blowing of which gives the signal for the fight. A second pair thrusts a *triśūla* (trident) into the belly of a demon, while another pair above the goddess' head hurls something, perhaps a *mushala* (pestle). The other hands exhibit various other weapons and attributes, such as *varada mudrā*, *sarpa* (snake), *ḍamaru*, *śakti*, *karttṛi* (dagger), *tarjani* (pointing finger), *dhanush* (bow), *vāṇa* (arrow), *asi*, *kheṭaka*, *chakra*, *śūla*, *pāśa* (noose), *utpala* (lotus), *daṇḍa*, *paraśu* (axe), *gadā*, *ghaṇṭā*, *abhaya*, *vajra* (thunderbolt), *darpaṇa* (mirror), etc. In spite of the rather large number of additional arms the image is wonderfully organic, a point which signifies concentrated energy, before which the demons are already seen to be retreating. A female figure on the proper right holds an umbrella over the head of the goddess, while on the top are shown representations of various other gods, such as Brahmā, Vishṇu, Śiva, Sūryya, Ganeśa, etc. Of the fighting attendants of the goddess two are seen in the present sculpture, one at the top and the other on the pedestal, which also shows, besides lotus rosettes, the donor and his wife, as well as the representation of a bearded and emaciated male figure seated in *dhyāna* posture.

The execution of the sculpture is masterful in the extreme. The artist has put remarkable life and reality into the whole theme. The prancing lion, the *pratyālīḍha* (fighting) pose, the various weapons—held not merely as qualifying attributes but being actually used as weapons of war—, beautifully portray an actual fight going on between the goddess and the demons, who, unable to bear the combined and concentrated energy of the goddess, slowly retreat before her onslaught.

In this brief account of the trip, which I had the privilege of undertaking under the kind direction of Mr. Stapleton, I hope I have been able to show the importance of the locality visited, from the antiquarian as well as the archæological point of view. I will consider my labours fully repaid if this preliminary account induces scholars, better gifted and better equipped than myself, to take up the study of this important centre of an ancient civilization, which, hitherto, has been almost buried in oblivion.

Note.—For the villages mentioned in this paper, as well as those referred to in the paper dealing with the previous tours, reference may be made to the Map given in Mr. H. E. Stapleton's paper on 'Note on the Historical and Archæological results of a Tour in the Districts of Māldah and Dinājpur, December 24th–31st, 1932,' published in *J.P.A.S.B.*, Vol. XXVIII, 1932, Plate 4.

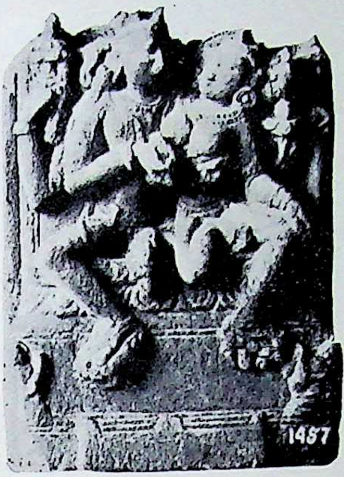

FIG. 1. Lakshmī-Nārāyaṇa from Eshnail.

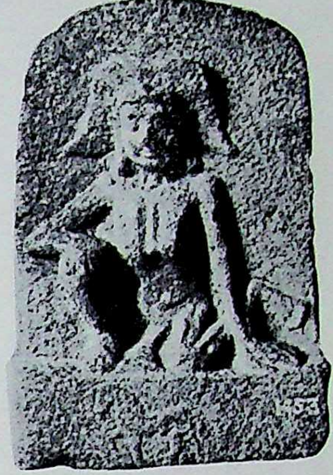

FIG. 2. Danturā from Kaṭā-shan.

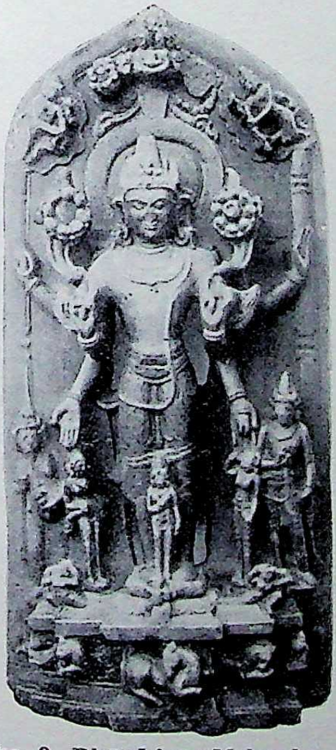

FIG. 3. Dhātrī from Mahendra.

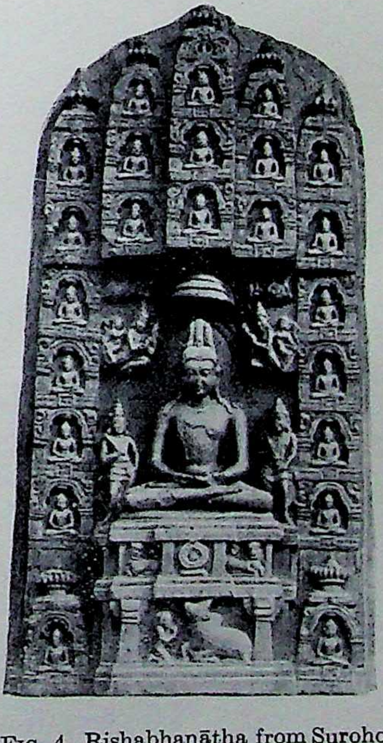

FIG. 4. Ṛishabhanātha from Surohor.

By courtesy of the Rajshahi Museum authorities.

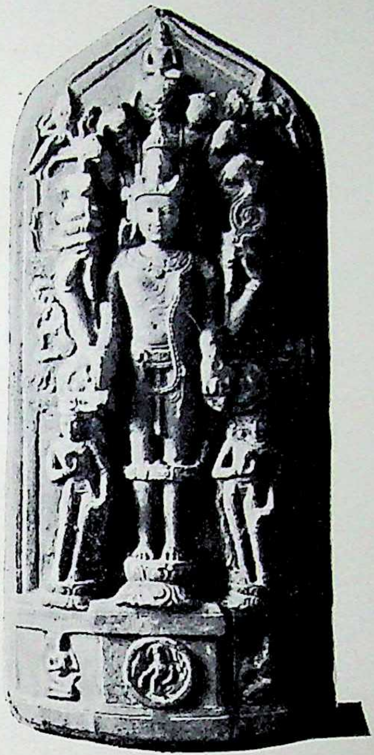

FIG. 1. Vishṇu with Snake canopy from Surohor.

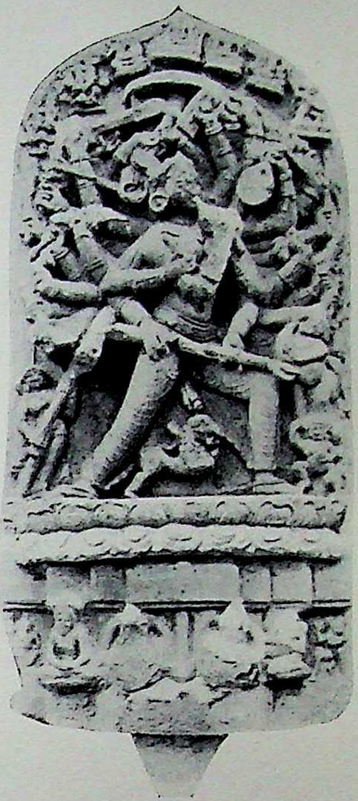

FIG. 2. Chaṇḍikā with thirty-two hands in Betnā Kālībārī.

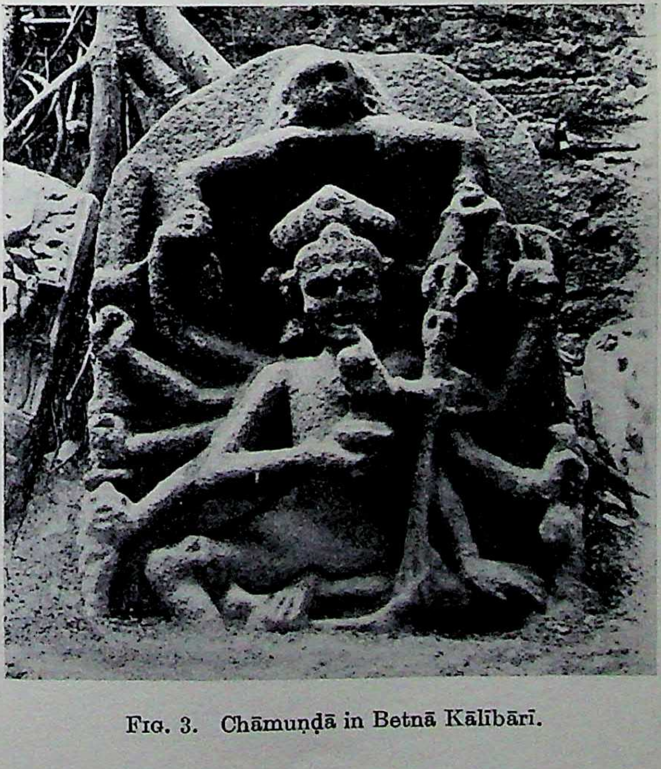

FIG. 3. Chāmuṇḍā in Betnā Kālībārī.

ARTICLE NO. 9.

Mud-fishing in Lower Bengal.

By SUNDER LAL HORA.

(*Published with permission of the Director, Zoological Survey of India*)

INTRODUCTION.

While carrying out investigations on the brackish waters in the neighbourhood of Calcutta and other places in Lower Bengal, a few interesting methods of fishing in semi-liquid mud have come under my observation. They show the great ingenuity that is displayed by the local people in catching fish, and, from a biological point of view, their study is very instructive as it reveals the great adaptability of several of the commoner species to highly adverse conditions of existence.

In studying these fisheries it has to be borne in mind that in Bengal, as well as in several other parts of India, there is a long rainy season extending from June to September (south-west monsoons) which alternates with a much longer dry season. Between October and May there are occasional showers, but they do not seem to be of much significance from the fisheries point of view. Another factor that deserves special notice is the presence of a large number of tidal creeks and estuaries that are to be found in Lower Bengal. These, as well as several canals, are embanked, and in this way vast tracts of land have been reclaimed for cultivation. In making these embankments earth is taken from the adjoining lands, thus a belt of low-lying land with a series of pools and puddles usually runs on either side of an embankment. The water in these pools is usually brackish, and the paddy that grows in these parts is of the special variety known as *Nuna Dhan* or the brackish-water rice. The straw of this paddy is said to be brackish in taste, and is not relished by cattle that are not used to eating it.

During the rainy season the entire country is inundated, and the low-lying parts revert to the original swampy condition, but with this difference that the water is now almost entirely fresh. With the commencement of the dry season in October-November, when the water begins to fall, the salinity increases gradually. But there can be no doubt that with the successive inundations more and more of the salts are being washed out of the soil and carried away by floods. At the same time good earth is brought to these parts in suspension from the neighbouring high lands and deposited as silt. The evidence of such a process is clearly afforded by the fact that in the Salt Lakes of

Calcutta the water is now only slightly brackish and that they are no longer under the influence of tides.

It is seen from the above that there are two important ecological factors which an animal association living in pools and puddles in Lower Bengal has to contend with, namely, the variation in the salinity of water due to floods and evaporation; and secondly the rapidly decreasing quantity and final disappearance of water during the dry season, and the consequent lack of facilities for aquatic respiration. When the water begins to dry up, the animals congregate into deeper and deeper portions of the fields and pools, and ultimately burrow in the soft mud to considerable depths and there æstivate till the return of more favourable conditions. On the return of the rainy season, these pits are the first to be filled with water, and the animals lying deep below their surface are awakened from their forced slumber. The methods of fisheries, as well as the peculiar behaviour of the fauna, are the direct outcome of the physical conditions referred to above. In the following pages I propose to describe some of the fishing methods, and to give lists of species obtained by these methods. Biological notes on the animals constituting the catch will be published later in the *Records of the Indian Museum*.

MUD-FISHING.

'An extremely common method of destruction of fish practised in every part of the country is by draining the fishery dry and then catching every fish in it by hand. This method is seen working in all small fisheries, railway cuttings, roadside drains, and small depressions of the ground. When the water cannot be drained it is laboriously bailed out.'[1] During rains when the country is flooded, a large number of fish leave rivers, lakes, and tanks and wander over paddy fields and other low-lying parts of the country. Most of the carps come out to breed in these shallow waters. When the water begins to fall, only a few are able to get back to deeper channels while the majority of these fish are stranded in small fisheries. Branches of trees are stuck in the pools to attract fish which resort to this improvised shelter for safety. The following methods of catching fish have been observed:—

On the 2nd of January, 1933, a boy was observed catching fish (plate 10, fig. 1) at Uttarbhag in the low-lying part of a paddy field. The greater part of the field was dry and hard, but an area of about 38 feet by 21 feet contained soft mud with small pools of water. The boy had been moving about in this slushy area, and in consequence the water was thick with mud and could almost be described as semi-liquid; it was very foul and was smelling strongly of sulphurated hydrogen. In catching the fish the boy first felt about with his hands in the mud. Sometimes the movement of the fish, especially when it came up to the surface to take a mouthful of air, disclosed its presence at a particular spot whence it was scooped. In those areas where the mud was somewhat firm and undisturbed the presence of certain species was betrayed by their burrows, from which they were very cleverly taken out by the boy. In the case of small species swimming in water, both hands were used to scoop them out from underneath. On my taking an interest in the boy's catch, which was kept in a small earthen pot, three other boys joined him (plate 10, fig. 2) and in about half-an-hour's time they brought to me a representative collection of animals from this puddle containing 353 specimens. The collection contained the following 15 species of fish, 4 species of prawns, and one species of crab :—

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[1] De, *Rep. Fisheries Eastern Bengal and Assam*, p. 58 (1910).

Fish.

1. *Aoria gulio* (Ham. Buch.).
2. *Barbus* (*Puntius*) *ticto* (Ham. Buch.).
3. *Barbus* (*Puntius*) *sophore* (Ham. Buch.).
4. *Esomus danricus* (Ham. Buch.).
5. *Xenentodon cancila* (Ham. Buch.).
6. *Panchax panchax* (Ham. Buch.).
7. *Aplocheilus melastigma* McClelland.
8. *Mastacembelus pancalus* (Ham. Buch.).
9. *Ophicephalus striatus* Bloch.
10. *Ophicephalus punctatus* Bloch.
11. *Anabas testudineus* Bl. and Schn.
12. *Nandus nandus* (Ham. Buch.).
13. *Ctenogobius alcocki* (Annandale).
14. *Glossogobius giuris* (Ham. Buch.).
15. *Pseudapocryptes lanceolatus* (Bl. and Schn.).

Prawns.

16. *Metapeneus monoceros* (Fabr.).
17. *Metapeneus brevicornis* (M.-Edw.).
18. *Caridina propinqua* de Man.
19. *Palaemon* (*Eupalaemon*) *lamerrei* M.-Edw.

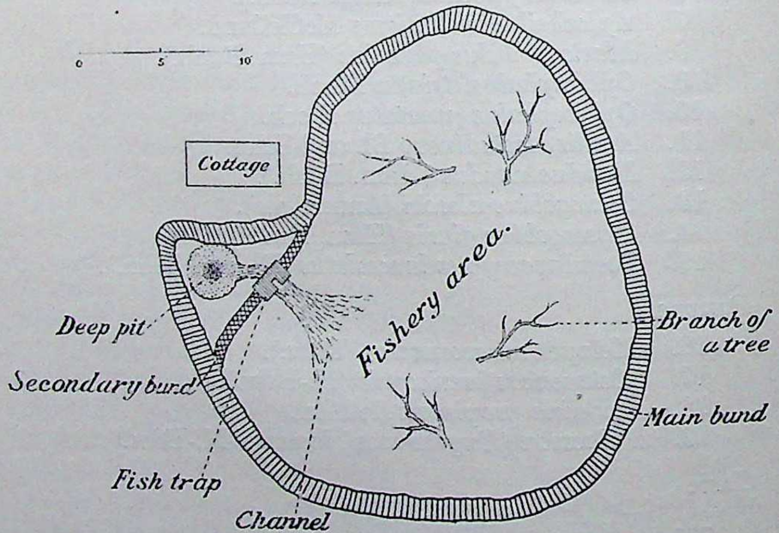
Crab.

20. *Varuna literata* (Fabr.).

Of these species, the crab was the most abundant, and among the fish *Panchax* was the commonest. When the boys had finished catching fish and the water had been allowed to settle for some time, a larger number of small *Panchax* and *Barbus* were found swimming about in pools. Some of the species of fish, such as *Aoria gulio*, *Ophicephalus striatus*, *O. punctatus*, *Anabas testudineus*, *Pseudapocryptes lanceolatus*, etc., are known to breathe air, but there is no doubt that the other species mentioned in the list must also be capable of making use of atmospheric air for respiration. The salinity of the water was 4·38 per mille, but unfortunately I did not take the temperature. The temperature of water in the shallow pools about 2 P.M. in the afternoon must be considerable. The fauna is thus adapted to live in very adverse conditions.

We were informed that three or four days after our visit this portion of the paddy field dried up altogether. When we visited the place again on the 8th of February the upper layer had become cracked and the surface was covered with a thin layer of salts, presumably derived either from the salts originally dissolved in the water or by a process of efflorescence from the soil. A few holes were observed at the surface and the place was dug up to a depth of about 4 feet. A couple of æstivating crabs were taken, but no fish was obtained. Probably fishes burrow to a much greater depth.

The most common and very successful method is by draining the fishery area dry. As one approaches Uttarbhag from Baruipur in January-February, a regular belt of small fisheries [1] (plate 11, fig. 1) is seen on the left-hand side in front of the houses along the road. The road runs on an embankment and in making it earth seems to have been dug out from the



TEXT-FIG. 1.—Diagrammatic representation of a small fishery area at Uttarbhag as it was being drained dry for fishing.

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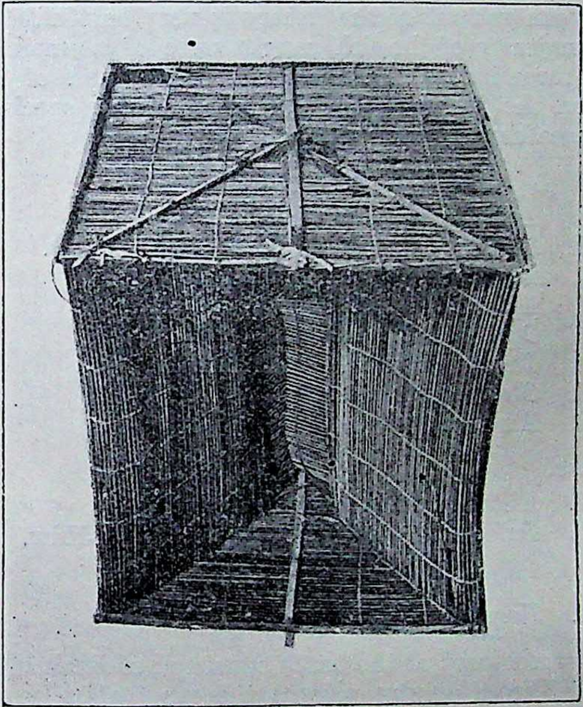
[1] A water sample taken from the channel on the 16th March, 1933, showed a salinity of 17·61 per mille. I believe at exceptionally high tides the water of the Piali Nadi flows into this channel. These waters are distinctly alkaline, the pH being from 8·2 to 8·4.

sides thus forming belts of low-lying lands which are now used for fishery purposes. In March the embankment was being repaired with the earth dug from the sides, thus rows of fairly deep pits had been formed. Each household seemed to have enclosed a portion of the channel by means of a fairly high *bund* as soon as the water began to fall. Branches of trees, etc., can be seen stuck in the middle of each enclosed area in order to prevent the fishery from being fished by means of a cast-net and to provide shelter for fishes. When the water falls sufficiently low, a small portion of the fishery is enclosed by a secondary *bund* (plate 11, fig. 2) in the middle of which a fish-trap is placed. A deep pit is dug in the small enclosed area and leading to it is a small channel from the main area. The water is then bailed out from the small pit with an enamelled soup-plate, and as this is done the water in the main area flows through the trap carrying the fish with it. A piece of old cloth is stretched, like a sail, over the secondary *bund* so as to prevent any fish from jumping over this obstruction. By this elaborate device all chances of fish getting into the pit are eliminated, so that the bailing of water can be done without running the risk of accidentally throwing out any fish in the process.



TEXT-FIG. 2.—The fish-trap usually used in mud-fishing.

When the fishery is drained dry numerous small children work over the area (plate 11, fig. 3), collecting the fish and crabs that remain in the mud. They carry about an earthen pot with them to which they go on transferring their catch. In this process branches of trees are removed. In spite of all this, it seems that quite a number of fish escape attention. After fishing for the day, water is let in the fishery and a few days after the process of fishing is repeated. I was informed that in an area of about 25 feet square 4 to 5 lbs. of fish are collected. It may seem a poor return for the labour expended, but in such calculations it has to be borne in mind that after the paddy harvest these people have no work to do, and whatever little they can get out of the fishery is very helpful.

The majority of the fish caught were of a small size, not exceeding three inches in length. From a sample of the catch obtained on the 8th of February, the following species of fish and crustacea have been identified :—

Fish.

1. *Aoria gulio* (Ham. Buch.).
2. *Barbus* (*Puntius*) *sophore* (Ham. Buch.).
3. *Esomus danricus* (Ham. Buch.).
4. *Aplocheilus malastigma* McClelland.
5. *Ophicephalus striatus* Bloch.
6. *Ctenogobius alcocki* (Annandale).
7. *Glossogobius giuris* (Ham. Buch.).
8. *Ambassis ranga* (Ham. Buch.).

Prawns.

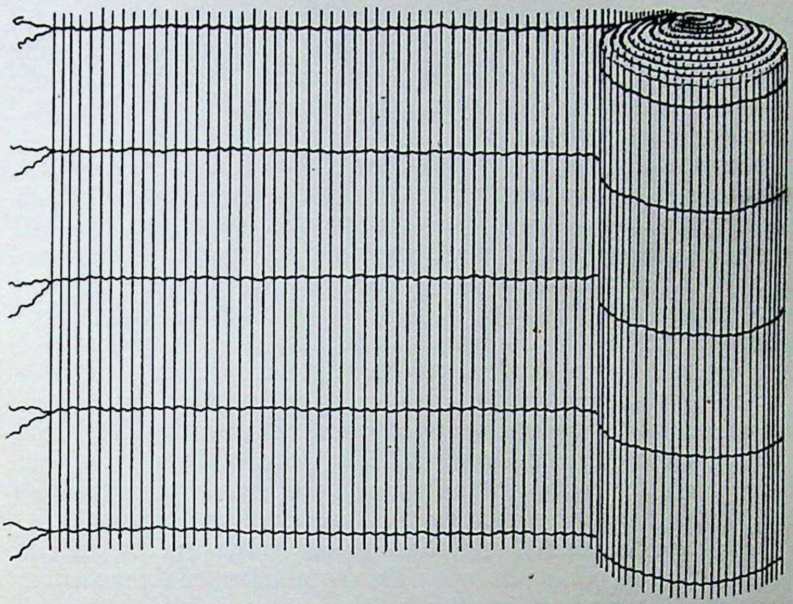
9. *Metapeneus brevicornis* (M.-Edw.).
10. *Palaemon* (*Eupalaemon*) *lamerrei* M.-Edw.

Crab.

11. *Varuna literata* (Fabr.).

The greater part of the catch consisted of *Barbus* (*Puntius*) *sophore*, and from among prawns the most abundant species was *Palaemon* (*Eupalaemon*) *lamerrei*.

When deeper and larger fisheries are to be drained, dugouts made from trunks of palm-trees are used for bailing out water (plate 10, fig. 3). The fishery is usually cut up into sections and each section is drained dry (plate 11, fig. 4) and the helpless fish are picked up from the mud. Early in March, this method of fishing was observed on both sides of the Diamond Harbour Road 3 to 4 miles beyond Behala. When an area is to be partitioned off by a *bund*, first of all a bamboo screen considerably higher than the level of the water is put up so as to prevent fish from jumping over to the main area. This precaution seems to be absolutely essential for I have seen *Barbus sophore*, a small fish of about 2 to 3 inches in size, jumping out of water



TEXT-FIG. 3.—The bamboo screen (modified, after De).

as high as 2 to 3 feet.[1] A usual feature of these fisheries is the presence of a large number of Brahmani kites, which feast on the leaping fish or on those that are left struggling on the drained fishery-bed.

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[1] The leaping habits of *Barbus* (*Puntius*) *sophore* have become proverbial in the Bengali language. When a man of small means struts about in imitation of rich people, he is said to behave like a *sophori*. Similarly a tall-talker is characterized as a *sophori*. In Bengal a Sanskrit quotation is current as follows :—

Śapharī pharpharāyate. This is only the last quarter of a Sanskrit śloka attributed to Vararuci.

" अगाधजलसञ्चारी विकारी न च रोहितः ।
गण्डूष-जलमात्रेण शफरी फर्फरायते ॥ "

"The *Rohita* fish which remains in fathomless water does not become presumptuous but the small Śapharī madly jumps about already in finger-deep water."

In Bengal there is a similar vernacular expression with reference to the *Kai* fish.

অল্প জলে কই মাছ ছড়্ ছড়্ করে।

"The *Kai* fish will jump in little water."

Further the leaping habits of larger carps such as *Catla*, *Mrigal*, and *Rohu*, when they are fished with large nets, are well known. *Barbus sophore*, though very poor in substance on account of its small size, is presumed to imitate larger carps in leaping about to great heights.

On enquiry it was found that *Barbus sophore* is the fish extensively collected by this method, though air-breathing fishes, such as *Ophicephalus, Anabas, Clarias, Saccobranchus*, etc., are also obtained in fair quantities. A number of other small species are also collected.

Sometimes the small, shallow fisheries are not drained but the fish are caught with the hands while resting on the bottom mud. In January several parties of women and girls were seen catching fish in pools and ponds along the short branch road to the Sonarpur Railway Station. By stooping in knee-deep water (plate 11, fig. 4), the fish are searched for in small holes and pits at the bottom with the hands, and when caught they are put in an earthen pot that is kept floating close by. I was informed that certain fish are stupid enough not to move away from their retreats when touched with the hands. Crabs are also taken out from holes at the bottom. We examined the entire catch of a party of three persons and found in it representatives of three species of fish, *viz. Barbus* (*Puntius*) *sophore* (H.B.), *Nandus nandus* (H.B.), and *Glossogobius giuris* (H.B.), and one species of crab, *Potamon* sp. The specimens of fish obtained were of a somewhat larger size than those obtained by the processes of mud-fishing described above.

The above method of fishing is resorted to in clear water, but when the surface is covered with vegetation, as is the case with the ponds along the Diamond Harbour Road, small sieve-like baskets or nets are used for dragging out fish from mud and vegetation. The mesh of these baskets is so fine that even the smallest fish cannot escape through it.

EXPLANATIONS OF PLATES.

PLATE 10.

MUD-FISHING IN LOWER BENGAL.

Fig. 1.—A boy catching fish at Uttarbhag in the low-lying part of a paddy field. The small earthen pot by the side of the boy is used as a receptacle for the catch. Notice the muddy nature and the shallowness of the water and the stooping posture of the boy when feeling about with his hands in the mud for fish.

Fig. 2.—Four boys collecting fish in the same place as above. They obtained 353 specimens in about half-an-hour's time. Notice the shallowness of the water and its distribution into small pools separated by lumps of mud.

Fig. 3.—In draining larger fisheries, dugouts made from trunks of palm-trees are used for bailing out water. Notice the four men operating two dugouts. The two men near the bamboo-screen had just finished partitioning off a small area of the fishery. A portion of the extensive fishery area behind the bamboo-screen may also be noticed.

Fig. 4.—Water in a large fishery has to be bailed out from several sides, and in each attempt a small partitioned area is drained dry. Notice the dry area between the two *bunds* which are holding back water at a much higher level. Having finished bailing of water from the position

shown in Fig. 3, the dugouts are now to be removed from there and fixed in the position of the man on the extreme left of the picture. The tall bamboo-screen behind the fixed bailing mechanism may also be noticed.

PLATE 11.

MUD-FISHING IN LOWER BENGAL.

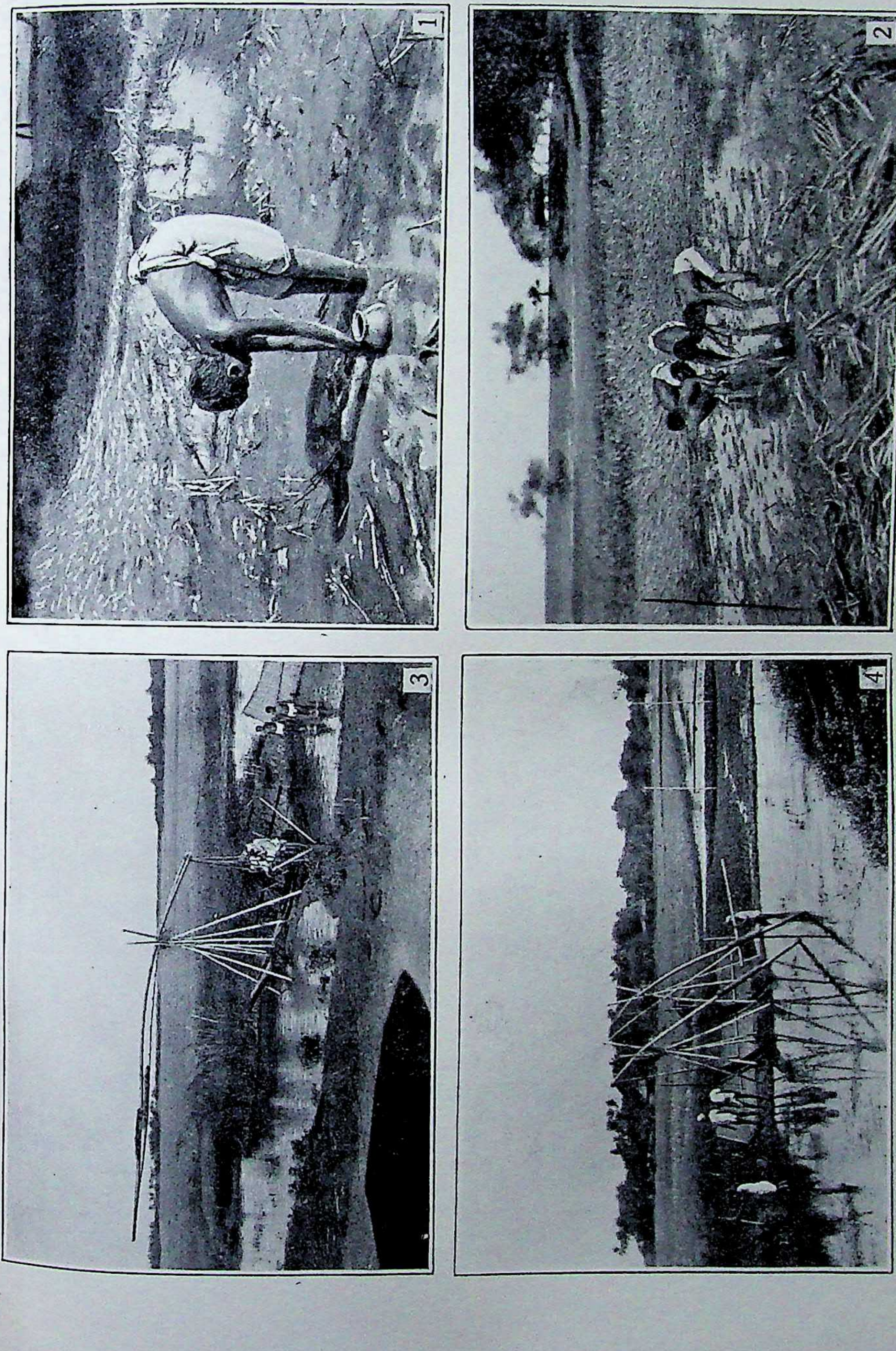
Fig. 1.—A small enclosed fishery by the side of the road at Uttarbhag. Notice the branches of trees stuck in the middle of the fishery and a small area enclosed on its left-hand side for bailing out water.

Fig. 2.—The left-hand portion of the above fishery on a somewhat larger scale showing the nature of the secondary *bund*. Notice a piece of cloth stretched, like a sail, over the secondary *bund*. The woman is mending the *bund* and the man is resting for a while after bailing the water with the enamelled plate lying on the shore.

Fig. 3.—When a fishery is drained dry numerous small children work over the area, collecting fish and crabs that remain in the mud. Notice the earthen pot which the children carry about with them to put in their catch. The man on the other side of the bamboo-bridge bails out the water from a pit in which he is standing.

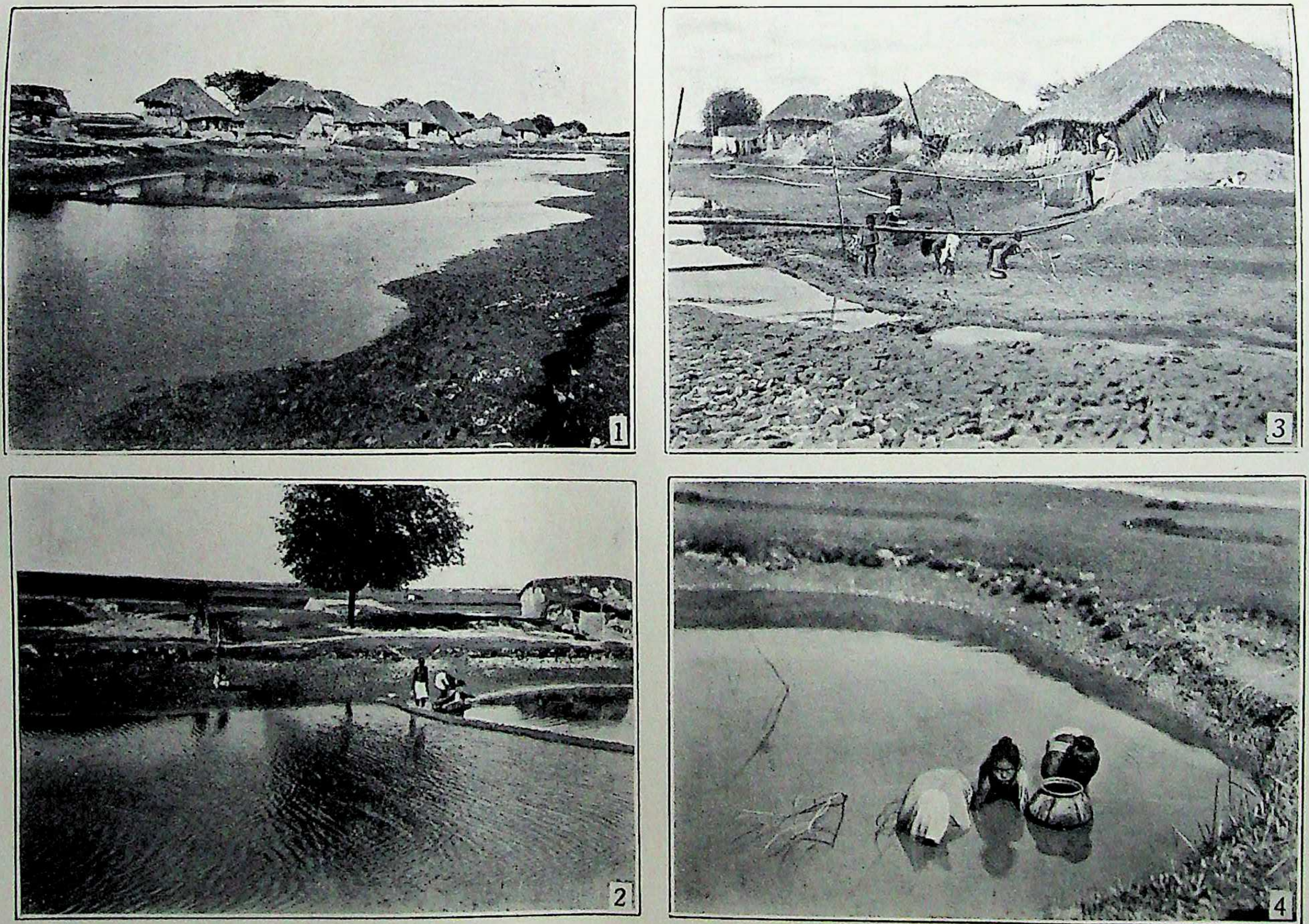
Fig. 4.—A party of one woman and two girls catching fish in a large pool near Kuriagachi (about a mile and a half from Sonarpur Railway Station) by stooping in water and searching for fish in small holes and pits at the bottom with the hands. Notice the large earthen pot that is kept floating close by for keeping the catch. (The woman in purdah is a Hindu widow and the two girls are her daughters).

PLATE 10.



Mud-fishing in Lower Bengal.

D. Bagchi, Photo.



D. Bagchi, Photo

Mud-fishing in Lower Bengal.

ARTICLE No. 10.

The House of Gotarzes: a chapter of Parthian History in the Shahnameh.

By SIR J. C. COYAJEE.

In his great epic when touching all too briefly on the Parthian age, Firdausi tells us with a noble ingenuousness that he knew nothing of the history of the Parthians except a few royal names :

ازیشان بجز نام نشنیده ام   نه در نامهٔ خسروان دیده ام

(I have heard but their names ; and have not read of them in the book of 'Kings'). Nevertheless eminent historians are of opinion that a good deal of Parthian history can be traced in the Shahnameh mixed up with the annals of the Kaiyānian dynasty. It was impossible indeed to keep out the glorious deeds of five centuries of Parthian history from the national annals in spite of the great reluctance of the Sassanide editors and collectors of the country's traditions to chronicle the greatness of their hated predecessors. The result has been that we find Parthian kings and princes like Gudarz (Gotarzes), Gew and Karen introduced into the national epic as Knights of the round table of King Kaikhusrau and his predecessors, and that we get occasional glimpses of Parthian history and descriptions of individual Parthian exploits in the midst of what is the general history of quite other ages and dynasties. Eminent Iranian scholars like Marquardt, Noldeke and Herzfeld have hinted that it is possible to trace some Parthian history in the great epic of Firdausi, and have gone further so far as to say that Gudarz (one of the *heroes* of the Shahnameh) represents the Parthian King Gotarzes I (cf. Herzfeld, *Am Tor Von Asien*, pp. 46-47).

Nevertheless there has been no detailed study of the topic, nor has it been noticed that there is one 'chapter' of the Shahnameh, in which we find *a continuous narration of some decades of Parthian history*. That is the portion of the epic beginning with the murder of prince Farud and ending with the great fights of Iranians at Ladan and Hamawan and with Kamus the Kushanian, and others. It will be shown by a comparison of that part of the Shahnameh with narrations of Parthian history by classical writers, like Justin and Tacitus, that here at least Firdausi is following steadily and continuously the lines of actual Parthian history in the proper chronological sequence and order. Fortunately the incidents which stand out in Firdausi's narrative are some of the same

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THE CENTRAL THEME OF THIS PORTION OF THE SHAHNAMEH.

I invite attention to the fact that a single thread of narration runs through the whole portion of the Shahnameh which we are considering—and that central theme is the success and glorification of the house of Gudarz (Gotarzes, the Parthian king). Indeed I venture to suggest that this whole portion of the Persian epic is based upon the number of ballads celebrating the exploits of Gudarz (Gotarzes) and his family. The narration opens with the murder of the young and gifted prince Farud; and the consequences of that tragedy are found to be immediately favourable to the hero Gudarz (Gotarzes) who is raised to the chief command in the army, as a consequence.

سبک طوس را باز گردان ز جای   ز فرمان مگر دو مزن هیچ رای
سر افراز گو در ازان انجمن   بهـــر کار باشد ترا رای زن

(Quickly send back Tusa; the illustrious Gudarz should be thy guide in all operations.)

We might note further that while Gudarz thus gains largely by the murder of Farud, an attempt is made in the account to attribute the chief guilt of the murder to other noble men. Then follows the struggle between the son and grandson of Gudarz (Gotarzes) with Palashan and here again the house of Gudarz triumphs. The third phase is the fight with Tazhav; and there also the whole credit is given to Bezan (a relation of Gudarz), who not only puts Tazhav to flight but deprives him of his beautiful wife Ispanoe: The bias on the side of Gudarz can be traced much further. For indeed all other Iranian heroes like Tusa and Fariburz are made to do nothing but commit blunders from the consequences of which they are saved by the intervention either of Gudarz or of some relation of his. Thus when Fariburz, the commander-in-chief, is running away from the battle, it is Gudarz and his party who save the situation as well as the national standard.

فریبـــرز باید کزان قلبـــگاه   گریزان بپـــوید ز قلب سپاه
یکایک بدشمن سپردند جای   ز گردان ایران بند کس بپای
چو گودرز کشواد از قلبـــگاه   درفش فریبـــر ز کاوس شاه

ندید ویلان سپه را ندید   بکردار اتش دلش بر دمید
به بیژن چنین گفت گودرز پیر   کز ایدر برو تیز با گز و تیر
بسوی فریبر ز برکش عنان   بپیش من آراختهٔ گاویان

[Fariburz fled from the centre, and so did the Persians who left the field to the enemy. But when Gudarz saw this his heart was fired with rage ; and the old man told Bezan to ride towards Fariburz and to bring away from him the standard of Gaweh.]

Nor is it enough that commanders like Tusa and Fariburz are made to run away while Gotarzes and his offspring are left to redeem the day. The hero Gustaham is rescued from certain death by one of the house of Gotarzes more than once. Then again in the formation of the line of battle it is the house of Gotarzes to which the right wing is assigned.

On these grounds it is submitted in this present paper that this portion of the Shahnameh—or rather of its predecessor the Bastannameh—was based upon ballads recounting the deeds of the house of Gotarzes (Gudarz) which must have been very popular in Northern Persia and especially in Hyrcania. Indeed as late as the time of Firdausi we find such ballads relating to the house of Gotarzes still popularly sung and waiting to be taken up into histories. For the poets tell us that his account of the loves of Bezan (a grandson of Gotarzes) and Manizheh was based on a ballad sung to him by a lady of his own family. In earlier times such ballads narrating the exploits of the heroes of the line of Gotarzes must naturally have been much more common. For the topic of the house of Gotarzes was indeed one well-suited for the objects of the bard and the minstrels. The career of Gotarzes himself was such as to appeal to the minstrel and to the poet of Fortune's vicissitudes he had the most ample share—now ruling over all Iran and playing the part of a champion of Iranian patriotism against pretenders supported by Rome ; at other times flying to remote Hyrcania and execrated as a tyrant. As a warrior he was great and Tacitus does justice at once to his 'terrible courage' (*Annals*, Book XII, 14) and to the skill with which he turned tables on his all but victorious foe Carenes by attacking him in the rear. He was obviously proud of his martial character, for on his coins he describes himself not only as King of Kings of the Arians but as 'Kalymenos' (champion and military factotum) of Artabanos. At least twice in his career he showed himself capable of highly chivalrous conduct—first when he divulged to his rival Vardanes I, a plot against the latter's life and again when he spared the life of his defeated rival Meherdates. He is also one of the few Parthian kings whose attachment and practice of the national religion has been placed on record by history. Thus Tacitus speaks of the 'special worship of Hercules' by Gotarzes. By this deity is no doubt intended the angel Verethraghna who was often described in Greek records as Hercules Artagnes (cf. Tacitus, *Annals*, Book XII, 13).

It might be suggested further that these ballads can still be traced in their outlines in the epic of Firdausi. There is, to start with, the one relating to the tragedy of Kalat (i.e. the murder of Vardanes of Farud). That is followed by—though in noway connected with—the ballad about the fight between Bezan and Palashan which, as we shall attempt to show later, refers to the struggle between the successors of Gotarzes with Vologeses I and which very likely led to the separation of Hyrcania from Parthia. Then follows another poem integral in itself in which celebrates Bezan's exploits against Tazhav culminating in the capture of the latter's beautiful wife. So far there have been only descriptions of successful wars. But tragedy—almost unrelieved tragedy, one might say, supervenes. There, for example, is the pretty ballad about the death of the very young boy Bahram (of the family Gotarzes) who performs great exploits but who loses his life ultimately in attempting to gratify a boyish whim, when he returned to look for a favourite whip on the field of battle. Lastly the ballads turn to the disappearance of the house of Gotarzes when the heroes fell with their faces to the foe on the well-stricken fields of Poshan, Ladan, and Hamawan. In some of the most beautifully tragic and pathetic verses of the great epic we seem to hear the echoes of the wild accents of grief of the ballads which must have stirred the essentially nomadic and warlike heart of Parthia for centuries. There is room here only to mention a few instances of these accents of passionate grief. Thus,

همي كوه از خون گودرزيان   بزنار خونين ببندد ميان

(Such are the streams of blood of the descendants of Gotarzes descending the sides of the mountains, that they are like girdles tied to the mountain-side.)

در کاخ گودرز کشوادگان   تهی شد ز گردان و ازادگان
ستاره بر ایشان بنالد همي   بپالیز گلبن بنالد همي

(The gate of Gudarz stands emptied of its heroes and warriors. Even the stars shed tears on them while in the gardens the roses refuse to bloom.)

The proofs of the hero worship with which Gotarzes and his family were regarded by the Parthians are not confined to the portion of the Shahnameh under our notice. (I say advisedly 'by the Parthians'—since the Sassanides were most unlikely to go out of their way to do such honour to a Parthian prince.) For later in course of the epic we find that the exploits which, according to the Awesta, were performed by the warrior Tusa, are transferred to Gotarzes (Gudarz). Thus in verse 53 of the Aban Yasht we find the glory of vanquishing the swift sons of Vaisaka (i.e. the warriors Piran and Homan) ascribed to the warrior Tusa. But that honour is given in the Shahnameh to Gudarz (Gotarzes) and his son Gew. This sort of transfer in the face even of religious scriptures shows how strong the current of the national sentiment of Parthian ran in favour of the house of Gotarzes. One wonders whether this attributing of the exploit of Tusa to Gotarzes was due to a confusion between the Turanian name Vaisaka with the very similar name Vasaces which was borne by the commander of cavalry in the army of Vologeses I ? This Vasaces is mentioned in Tacitus, *Annals;* Book XV, S. 14 ; and of course there was every probability of an encounter between him and Gotarzes.

GUDARZ (GOTARZES).

Since our hypothesis is that the portion of the Shahnameh which we are about to study embodies a series of ballads glorifying Gotarzes and his dynasty, we shall begin by comparing the main features of the career of Gudarz as described by the Shahnameh with what we know of the history of Gotarzes. We shall find that in spite of the mingling up of the Gotarzes ballads with the saga of the round table of Kaikhusrau, the great epic fairly reproduces the leading features of the life of the historical hero. Thus in the epic Gudarz is one of the leading heroes at the court of King Khusrau who had been brought back to ascend the throne from the wilds of Turan (Scythia). Similarly in history Gotarzes figures as the 'Kalymenos' (قہرمان) or chief warrior of King Artabanus III. It is well known that this Artabanus III had been compelled to retire to the wilds of Hyrcania ; but later with the help of an army of the Dahae and Sakae he came back and reascended the throne of Iran. So in the epic, Kaikhusrau is brought to Iran by Gew, the son of Gudarz. In history it is 'Gotarzes Geopothros' who is the right hand man of Artabanus III. Further, as we shall see, in the epic it is Gudarz who is raised to the command of the Iranian army on the murder of Farud ; while as a historical fact Gotarzes was raised to throne on the murder of Vardanes. We do not know whether Gotarzes had any hand in the formation of the conspiracy which led to the murder of Vardanes ; but such a thing was not improbable ; and the Shahnameh might be voicing the contemporary belief or suspicion when it records that while quite a number of nobles assailed the young King Farud (Vardanes), it was Bizan and Raham (both related to Gudarz) who actually killed him.

History tells us indeed that Gotarzes had at the time of this murder retired to Hyrcania but that would not prevent some of his partisans and relations from taking a hand in the tragedy at Kalat, especially as Gotarzes was sure to benefit by it.

FARUD AND VARDANES.

With this introduction we enter on somewhat detailed study of the narratives of the Shahnameh with which we are directly concerned and first we must take up the episode of Farud. The epic makes Farud a half-brother of King Kaikhusrau. When the latter sent an army against Turan, he had given express orders that the army should avoid the famous fortress Kalat in the north-west of Persia, which was occupied by Farud. But the general of the army, in a rebellious spirit, approaches the fortress. This leads to a struggle with Farud who is killed by the grandson of Gudarz but only after his arrows have accounted for a number of Iranian heroes. When Kaikhusrau heard of this tragedy of Kalat he supersedes the general and ultimately appoints Gudarz in his place (Warner III, 83). The one person who benefits by the murder of Farud is Gudarz: Thus we read in the Shahnameh :

سبک طوس را باز گردان ز جای   ز فرمان مگر دو مزن هیچ رای
سر افراز گودرز ازان انجمن   بهر کار باشد ترا رای زن
ترا پیشرو گیو باشد بجنگ   که بافر و بر زاست و جنگ پلنگ

(King Kaikhusrau's orders were to send back the general Tusa in disgrace ; at the same time Gudarz is to be made the chief adviser in all operations, while his son Gew is to lead the van of the army.)

A comparison of the Farud of the epic and Vardanes of history shows close striking parallel. Both are young and warlike princes murdered in the prime of life. In character they were alike, for Vardanes aroused his nobles to conspiracy by his autocratic behaviour (Gutschmidt), while Farud too is represented as hot tempered and possesses a biting tongue. It is particularly interesting to note that the place where the tragedy was enacted was the same both according to the epic and the history. Farud is killed at Kalat in North-Western Persia : while Vardanes, when we last hear of him before his assassination, is conquering the Dahae and other 'intermediate tribes' in the north-west of Persia right up to the river Sind which Gutschmidt conjectures to be the Tejend (G. 126 Tacitus, *Annals*, XI, 10). Now we know from other sources that in these regions the most important movement of the day was the advance of the Tokharians in their victorious career (Gutschmidt, *op. cit.*, p. 133). It is a very significant detail that while according to history Vardanes was advancing in the lands of races like the Dahae and Tokharians, Firdausi expressly calls the auxiliary of Farud, by the name of Tokhar. When we remember that Tokhar is not a man's name but only the name of a tribe, we can see that this is a detail very important for the identification of the prince, which tradition has luckily preserved for us. From the narrative in the Shahnameh we infer that when Vardanes (Farud) was assassinated, it was his Tokharian auxiliaries alone who stood by him—presumably the Persian nobles being all in the conspiracy against the prince (Tacitus, *Annals*, Book XI, 10); for while the epic supplies us with numerous names of the assailants of the prince, the only person who assisted him is called Tokhar. Both princes again were assassinated by disobedient Iranian nobles. It might also be added that while Farud was the half-brother of King Kaikhusrau, the Vardanes of history was the half-brother of King Gotarzes. For as Gutschmidt observes, while Vardanes was the son of Artabanus III, Gotarzes was in a sense an adopted son of the latter. Surely so many coincidences could not be fortuitous; and hence we can have no hesitation in identifying Farud with Vardanes. At any rate it cannot be seriously argued that there existed two Persian princes with very similar names indeed, who were both assassinated in their early youth by rebellious nobles; that both were killed in very nearly the same locality, both being supported by Tokharian auxiliaries against their Iranian assailants.

The murder of such a prince as Vardanes must have created a profound and indelible impression in Iran and it is no matter for surprise that the fact was registered alike by history, tradition, and poetry. The young prince of great promise who had won great victories alike in the West over Seleucia, and over Gotarzes and who had carried Parthian power to its greatest pitch in the North and West (Gutschmidt 124) was suddenly removed. The event must have attracted great attention in the countries of the West as well; for when the philosopher Philostratus was in want of a hero for his new Cyropaedia, a century and a half later he selected Phraotes or Vardanes to play that illustrious part. The analogy of the name Phraotes to the epic name of Farud is so great as to amount to an identification. It is an interesting speculation to account for the fact that Philostratus mentions and describes our hero Farud under two closely related and similar names—as Vardanes and again as Phraotes. In fact Philostratus (who knew Parthia and its history very well) actually makes Vardanes and Phraotes (which is obviously the same name as Farud) contemporary rulers—the former of Parthia and the latter of what we might call Parthian India. I might be allowed to suggest that the explanation of this procedure was the old hatred of the Roman for his age-long rival—the Parthian ; and I emphasize the fact that the Emperor Caracalla, in whose time Philostratus was writing his historical romance, was particularly hostile to the Parthians and indeed deemed it perfectly legitimate to employ the most 'detestable treachery' (Sykes I, 386) in order to gain an advantage over them. Consequently though a courtly philosopher like Philostratus would have liked to write a new Cyropaedia for the benefit of Caracalla, yet it would have naturally seemed to him most impolitic to select a well-known King of Parthia to play the part of the new Cyrus. Very discreetly and prudently then this part was assigned to a fictitious 'double' of the Parthian king who was supposed to be a King of India. Nor was there anything violent in this supposition ; for about this period we witness the restoration of the Persian hegemony over nearer Asia and as far as the valley of the Indus (Huart 109). Indeed to this restoration of the Parthian hegemony the victories of Vardanes in Central Asia, which Tacitus refers to, must have contributed materially. For we learn from the great Roman historian that Vardanes (Farud) won tribute from peoples from whom no Arsasid had won it before and that he subdued the intermediate tribes as far as the river Sindes.

PALASHAN AND VOLOGESES I AND II.

Classical historians do not supply us with the names of the sons or other descendants of Gotarzes. But the authority of the Shahnameh which assigns to him 'eighty splendid sons' is reinforced by other indications of a decisive character. Thus the historian Tabari mentions one who corresponds to Gew (Persian) and Wew (in Pahlavi). A grandson Bezan (Pehlevi Wezan) is mentioned by Firdausi, Tabari and many other Eastern historians. If I might be permitted a conjecture, the word Bezan was in its origin the name of a dynasty or family, since it only signifies 'the son of Gew (or Wew)'. Indeed, it is only a Pahlavi translation of the name by which Gotarzes in his inscription describes himself—'Geopothros (=the son of Gew)'.

As mentioned above, in classical history there is no express mention of the exploits of these descendants of Gotarzes. But it is significant that all through the reign of Vologeses I (who came to the throne soon after the death of Gotarzes), Hyrcania was trying to break away and to form an independent state and that it succeeded at last in achieving its object with the result that after a decade's struggle Vologeses I had to acknowledge its independence by a treaty. We then call to mind that Hyrcania was in a sense identified with Gotarzes and his family, since both he and his grandfather used it as a place of refuge whenever they were defeated and lost their hold over the rest of Iran. Indeed Rawlinson infers that by a treaty between Gotarzes and Vardanes I, Hyrcania has been assigned to the former and that it was on that condition that the former agreed to relinquish his claims to the Parthian crown in favour of the latter. Putting these facts together one can safely infer that the rebellion in Hyrcania represented a civil war between the family of Gotarzes (which had always represented Hyrcania) on the one hand and the house of Vologeses I on the other. This inference is corroborated by the narrative in the Shahnameh which records the struggle between Bezan and Palashan. As we have seen Bezan (in Pehlavi Wezan) was, at least to begin with, a generic name for the family of Gotarzes. The name Palashan, on the other hand, is the Persian form of the Parthian name Walagash (Vologeses) (cf. Justi's *Iranisches Namenbuch*, pp. 240 and 344). The plural form Palashan is significant, because several sovereigns of the same name and family followed each other. Thus we find that the Shahnameh and classical history corroborate each other and shed supplementary light on events. In the main the Shahnameh is found to be correct, though it symbolizes a ten years' civil war between the houses of Gotarzes and Vologeses I by a single combat in the desert and ends it equally summarily by the death of Palashan. For according to most authorities Vologeses I had a long career and died a natural death. But there are other authorities who believe that the long reign ascribed generally to Vologeses I covers two shorter royal careers—one of which might easily have terminated fatally in the course of the long and bitter civil war.

ISPANOE AND ZENOBIA.

The next Parthian episode in the Shahnameh is the defeat of Tazhav by Bezan. The latter pursues his opponent Tazhav who made a noble effort to take away and save his wife Ispanoe with him on his horse. After a gallant effort, however, he was compelled by circumstances to leave his wife to her fate. I beg leave to quote the episode of the flight of Tazhav as translated from the Shahnameh by the Warners :

> He urged his steed toward the castle-gate,
> Pursued thus by Bizhan at lightning speed,
> And, when he heard the castle, Ispanwi
> Came wailing with her face suffused with tears,
> And cried out loudly to him : 'O Tazhav !
> Where are thy host, thy mettle, and thy might
> That thou shouldst turn thy back upon me thus,
> And leave me in this castle shamefully ?
> Give me a seat behind thee ; let me not
> Be left inside the castle for the foe.'

The heart of proud Tazhav was set on fire,
And his cheeks flamed. She mounted swift as wind
Behind him on his steed and clasped his waist.
He rushed along like dust with Ispanwi ;
They made toward Turan. The charger sped
Awhile till man and beast were both fordone,
And then Tazhav addressed his handmaid, saying :—
'O my fair mate ! here is a grievous case !
My charger is exhausted with this work,
Foes are behind, in front is a ravine,
And though we race Bizhan some distance yet
Still they will have their will of us at last ;
So as they are not enemies to thee
Remain behind while I urge on my horse.'
Then Ispanwi alighted from the steed :
Tazhav's face was all tears at losing her,
Yet sped he on to reach Afrasiyab.

This is a beautiful piece of poetic description from the great epic. But the poetic incident finds such a wonderfully close parallel in an actual event from contemporary Parthian history recorded by Tacitus that identity of the two episodes becomes most probable. Let us remember, again, that inferentially from Firdausi's account the incident occurred during the reign of Vologeses I, since its hero is again the same Bezan who was the foe of Palashan (Vologeses). According to Tacitus also (*Annals*, Book XII, 51), the event happened in the time of Vologeses I. The names of the husbands are indeed different ; Firdausi calls him by the name of Tazhav, while he is called Rhadamistus in Tacitus. On the other hand, the names of the heroines are not very different—being Zenobia in the Annals of Tacitus, and Ispanoe in the Shahnameh. It is difficult at least to believe that in the reign of the same prince Vologeses I, two incidents of so singular a character and remarkable in their resemblance to each other took place as are recorded in the two great authors. It is such a rare treat to compare the treatment of the same incident by masters like Firdausi and Tacitus that I quoted the translation of the relevant paragraph from Tacitus by Church and Brodribb :

'Rhadamistus had no means of escape but in the swiftness of the horse which bore him and his wife away. Pregnant as she was, she endured, somehow or other, out of fear of the enemy and love of her husband, the first part of the flight, but after a while, when she felt herself shaken by its continuous speed, she implored to be rescued by an honourable death from the shame of captivity. He at first embraced, cheered, and encouraged her, now admiring her heroism, now filled with a sickening apprehension at the idea of her being left to any man's mercy. Finally, urged by the intensity of his love and familiarity with dreadful deeds, he unsheathed his scymitar, and having stabbed her, dragged her to the bank of the Araxes and committed her to the stream, so that her very body might be swept away. Then in headlong flight he hurried to Iberia, his ancestral kingdom. Zenobia meanwhile (this was her name), as she yet breathed and showed signs of life on the calm water at the river's edge, was perceived by some shepherds, who inferring from her noble appearance that she was no base-born woman, bound up her wound and applied to it their rustic remedies. As soon as they knew her name and her adventure, they conveyed her to the city of Artaxata, whence she was conducted at the public charge to Tiridates, who received her kindly and treated her as a royal person.'

THE BALLAD OF BEZAN AND MENIZEH.

A critic might well raise the objection that according to Tacitus the heroine Zenobia as well as her husband Rhadamistus belonged to Armenia; that the incident of the flight of the two occurred in Armenia, and finally that we have so far given no proof that the house of Gotarzes was in any way connected with that country. To these queries the reply might be made that abundant proof can be furnished from the Shahnameh and other sources of the part taken by Bezan (descendants of Gew, the house of Gotarzes) in the affairs of Armenia. In the first place reference might be made to the ballad of Bezan and Menizeh incorporated in the Shahnameh. Following the usual convention in that epic (in which Afrasyab is made the general, and sole adversary of all Knights of the round table) Menizeh is represented as the daughter of that Turanian king. As a matter of fact, as Justi has shown, Menizeh is the feminine form of the Parthian name Manec. Now a Parthian of that name held command for the Parthian king in Armenia and defeated the famous Roman general Corbulo (cf. Tacitus, *Annals*, Book XV, 2–4). What is again most important for our purpose and for the history of the house of Gotarzes is that this noble man Manec lived in the time of King Vologeses I and it was this king who carried on (what Tacitus calls) 'the old feud' with the house of Gotarzes. Here is a reference which might be said to give something like a date to the happenings which have been poetized in the ballad of Bezan and Menizeh. The presence of a noble of the name of Manec in Armenia, and the existence of constant civil wars among Parthian nobles sets just the scene required for such occurrences as are sung in the ballad. There is nothing improbable in the son of a Parthian Montague (Bezan) falling in love with the daughter of a Capulet of the same race (Manec, the father of the fair Menizeh) and of being taught in his hours of imprisonment that 'love is too rough, too rude, too boisterous '. There is also the ancient tradition which lingered in Armenia that Bezan (of the house of Gotarzes) was imprisoned for his love of Menizeh in a cave at the place called Phyatkaran in that country—a tradition of which we learn from Mose's Geography. Nor does even this exhaust the proof of the activity of Bezan in Armenia. The Shahnameh begins the episode by observing that King Kaikhusrau had deputed Bezan to relieve the people of Arman (Armenians) from the inroads of wild boars. Moreover, the companion of Bezan's adventures in the ballad bears the name of Gurgin (Warkaina in Pehlevi). Now a reference to this name in Justi's Namenbuch will show how often it was borne by princes and nobles of old Iberia and Armenia. Indeed it is very remarkable how names of the house of Gotarzes—particularly those of Gew, Gurazeh, and Bezan have lingered among the noble houses of Georgia and Iberia almost up to our own days.

These very names were used, even in South Russia for some centuries. I emphasize this in order to show the general and long continued popularity of the legends of the house of Gotarzes in Northern Iran and adjacent countries like Armenia, since it is popular legends which are often the sources of current names.

DECLINE OF THE HOUSE OF GOTARZES.

That national tradition and minstrelsy which extolled so well the exploits of the house of Gotarzes did not fail to gild its abrupt decline, even though classical history has failed to give us any direct description of it. Nevertheless, we get some hints even from Roman historians of great nomadic movements which were bound to prove very prejudicial to the house of Gotarzes which ruled over Hyrcania. It is very significant that the house of Gotarzes suddenly disappears from view in Parthian history as left to us by classical historians, nor are we left quite without any clue as to the cause of this catastrophe. In the reign of Vologeses I, Parthia, Media, and Armenia as well as the Near East were overrun by nomads like the Alani from the East coast of the Caspian and by the Kushans who were driving the Tokharians before them (Gutschmidt, pp. 133–37, Rawlinson Parthia, pp. 294–6, Sykes, Vol. I, p. 379). As regards the Alani it has been supposed that their intervention was invited by the Hyrcanians themselves. But the Kushan and other nomadic invasions were of a different character, and it seems most probable that the house of Gotarzes suffered severely in the struggle which must have taken place. Hyrcania, it is true, continued an independent existence for decades, since it sent an embassy to the Emperor Antoninus Pius about the year 155 A.D. (Gutschmidt, p. 134). But we hear no more of the house of Gotarzes.

What we can thus merely conjecture from our knowledge of classical history and of Kushan invasions is amply described in the Shahnameh. There we have poetic descriptions of the heavy losses sustained by the family of Gotarzes in the course of wars with Kamus, the Kushan chief and other Turanian chiefs. Of course in the Shahnameh all invasions from Central Asia are attributed to the instigation of King Afrasyab. But the descriptions in the Shahnameh leave us in no doubt about the vast and mixed nomad army of Kushans and other races which rushed down on the North and West of Parthia. The passage from Firdausi dealing with description of the allied and mixed nomads has been so well-translated by the Warners that I beg leave to quote from their version :

بشد پهلوانِ تا سر تیغ کوه   بدیدار خاقان و توران گروه

سپه دید چندان که دریای روم   ازیشان نمودي چو یک مهره موم

کشاني و شکني و وهري سیاه   دگر گونه جوشن دگر گون کلاه

چغانی و چینی و سقلاب و هند   کهانی و رومی و نهری و سند

زبانی دگر گون بهـــر گوشهٔ   درفشی نو آئین و نو توشهٔ

‘ The mighty Rustam climbed the heights to view
The Khan and army of Turan ; he saw
A host so mighty that the sea of Rum
Seemed but a lump of wax compared to them !
The troops were from Kashan and Shakn and Wahr,
With divers coats of mail and divers helms,
Troops from Chaghan and Chin, Saklab and Hind,
Gahan and Rum, Sind and the Indus-banks.
In every quarter there were alien tongues,
Strange flags and meats ! ’

A great compliment is paid in the Persian epic to the leader of the Kushans.

ز کاموس خود جای گفتار نیست   که ما را بدو راه دیدار نیست

درختیست بارش همه گرز و تیغ   که گر بر سرش سنگ بارد ز میغ

ز پیلان جنگی نجوید گریز   سرش پر ز کینه دلش پر ستیز

‘ About Kamus himself we cannot speak,
For we have had no means of seeing him.
He is a Tree whose Fruits are mace and sword,
And, though the clouds rained stones upon his head,
He would not flee from elephants of war :
His head is full of wreak, his heart of strife.’

Nor is the actual course which the Kushan's invasion followed historically in various directions left obscure in the topic. For, as their leader says :

بسه بهره رانم ازین پس سپاه   کنم روز بر شاه ایران سیاه
یکی بهره ز ایشان فرستم ببلخ   بر ایرانیان بر کنم روز تلخ
دگر بهره بر سوی کابلستان   بکابل کشم خاک زابلستان
سوم بهره بر سوی ایران برم   ز ترکان بزرگان و شیران برم
زن و کودک و خورد و پیر و جوان   نمانم که ماند تنی پر روان
بر و بوم ایران نماند بجای   که نه دست بادا ازیشان نه پای

'Then will I part our army into three,
And darken the Iranian monarch's day.
I will dispatch one army unto Balkh,
And make day bitter to the Iranians,
Another to Kabulistan and bring
Kabul the ashes of Zabulistan,
And lead the third compact of mighty Turkmans
And Lions 'gainst Iran. I will spare none,
Not women, little children, young or old,
But overthrow Iran, both field and fell.
May not a hand or foot be left to them !'

It was in such struggle with the nomadic invasion that the great catastrophe of the house of Gotarzes happened :

در کاخ گودرز کشوادگان   تهی شد ز گردان و ازادگان
ستاره بر ایشان بنالد همی   بپالیز گلبن بنالد همی
ازیشان جهان پرز خاکست و خون   ... ...

'The portal of the palace of Gudarz,
Son of Kishwad, is void of men of war
And chiefs. The very stars are wailing them,
The rose no longer groweth in the garden,
The world through them is filled with dust and blood.'

Chronological Parallelism.

Finally we might proceed to give a brief and convenient summary of the chronological parallelism between the narrative in the Shahnameh and the sequence of events in Parthian History.

Parthian history.	*Narrative of Shahnameh.*
Vardanes assassinated (45 A.D.).	Death of Farud.
Reign of Gotarzes (51 A.D.).	Gudarz made commander.
Reign of Vologeses I and civil wars in Parthia (A.D. 51–75).	Bezan's combats with Palashan.
(The flight of Rhadamistus and the capture of his wife Zenobia A.D. 51 ?)	(Tazhav is pursued and deprived not his wife Ispanoe.)
Invasion of Parthia by the Alani and the Kushans.	The battles of Lādan and Hamāwan; the war of Kamus the Kushani.

Obviously the parallelism of history and epic is very close chronologically and such substantial parallelism strongly confirms our identification of particular heroes and incidents of the epic with those of history.

ARGUMENT FROM THE METHODS OF WARFARE.

Another corroborative argument for our view (that in the episodes in question we are dealing with Parthian history) is to be found in the methods of warfare employed. The accounts of fighting are highly realistic and give excellent examples of archery and cavalry engagements—aspects of war in which the Parthians excelled. The conventions and fictions of fighting which Firdausi observes in other parts of the epic are dropped here. Elsewhere the whole course of war is made to depend upon a single combat in which the Iranian hero—be it Rustam or Kershasp infallibly kills his opponent with a stroke of sword or mace and the victory is won; not so in the episodes with which we are concerned. There, to take but one example, one Iranian hero after another is unhorsed or disabled by the well-directed arrows of Farud (Vardanes). Just so we can imagine that the historical Vardanes must have faced the attack of the nobles who had conspired against him and must have brought down several of them by his skilful archery before he was overpowered. Let us glance next at the combat between Bezan and Palashan. Here again we seem to have before us a typical case of a cavalry raid and a sudden encounter and clash between two mounted bodies. The spirited passage in the Shahnameh is well-translated by the Warners :

پلاشان یکی آهو افگنده بود   کبابش بر آتش پراگنده بود
همي خورد اسپش چمان و چران   پلاشان فگنده ببازو کمان
چو اسپش ز دور اسپ بیژن بدید   خروشی بر اورد و اندر دمید
پلاشان بدانست کامد سوار   بیامد پسچیدهٔ کارزار
یکی بانگ برزد ببیژن بلند   ...   .

'Now Palashan, who had brought down a deer,
Was roasting some kabab upon a fire,
And eating with his bow upon his arm,
The while his horse was ranging free to graze
It saw afar the charger of Bizhan,
Neighed loudly, and ran in ; so Palashan
Knew that a horseman came prepared for fight,
And shouted to Bizhan.'

Finally, we come to the great struggles at Lādan and Hamāwan with the allied nomads from Tartary and Central Asia. Here, again, the accounts of warfare in the Shahnameh are highly realistic and there is a very and exact pointing of the might of the allied nomads advancing on Persia and the manœuvres and shifts to which the Iranian army facing them had to resort. Thus we find Fariburz, the Iranian general, resorting to a truce in order to gain time. Not succeeding in this the Iranians retire and fortify themselves on Mount Hamāwan and thence attempt night attacks on the foe. In a word, in the episodes with which we are dealing, the usual poetic conventions are laid aside and the Iranians (Parthians in this case) on the one hand and the nomads on the other are unmistakably realistic and life like.

Causes of the unrivalled popularity of the house of Gotarzes in Parthia.

The last problem which we shall discuss in the present paper is this : how can we account for the unrivalled popularity of the house of Gotarzes in the whole range of Parthian heroes and princes ? Parthia produced many princes far more eminent than Gotarzes. There is, for example, Mithradates II who saved Parthia and expanded it by the crushing defeats which he inflicted on the Sakae. There was Orodes I in whose time Crassus was defeated and slain. There was prince Pacorus who conquered Syria and Phrates IV who withstood and drove back Mark Antony. Yet none of them are remembered in the national epic. While they are utterly forgotten, to Gotarzes, and his family are devoted hundreds of pages in the Shahnameh ; and yet, in the opinion of an able historian like Rawlinson, the civil wars waged by Gotarzes and his successors were a main factor in the decline of Parthia.

We have seen already how many episodes in the Shahnameh are devoted to the house of Gotarzes. Let us now contrast with the slight mention made of some other Parthian heroes in the great epic. It might be mentioned that the only sequential narration of exploits among the Parthian notabilities is reserved for the house of Gotarzes—the others being given, so to say, only an occasional look in. Thus the claims of the great house of Karen which not only upheld Parthian monarchy but produced some of the finest heroes of the Sassanian age could not be entirely overlooked in the Shahnameh. But, as we have said, the mention is brief and occasional. A Karen is mentioned in the age of Minochihr and his successors and others in the ages of Shapor II, Yezdegerd I, Bahram Gor. The virtues of a Sokhra or Sufrai are mentioned under kings Peroz and Kobad. And if the house of Karen had to be content with occasional mention, other families could not expect more. The famous house of Mihran comes into view only now and then in the persons of Milad and of Gurgin ; even of such prominence it owed a great proportion to its feud with the house of Gotarzes. As for the other great Parthian house of Suren, which counted in its genealogy, several king makers as well as the great general who defeated Crassus, it is unrepresented in the Shahnameh, except by the traitor Mahoi Suri who betrayed the last Sassanian monarch.

But while the house of Gotarzes had the good fortune to secure the lion's share of poetic fame in the national epic, it received something like apotheosis in religious works like the Dadistan-i-Dinik. There its ancestor Gew is mentioned as one of the heroes who will assist in the work of inaugurating the millennium (West, *Pehlevi Texts*, II, 78).

How then can we account for the pre-eminence accorded to the house of Gotarzes both in the national epic as well as in religious tradition ? A conjectural reply is alone possible under the circumstances, but a comprehensive study of the history of Gotarzes and his family does suggest some considerations very relevant to the matter. One great title of Gotarzes and his descendants to great national gratitude and historical reputation was its successful assertion of the independence of the Hyrcanian nation against Parthia after a long period of dependence. They not only secured its independence but obtained for it an international recognition as we learn from the embassies sent by it to Rome.

A still greater and indeed indisputable title of the house of Gotarzes to epic renown was the gallant resistance which it offered to the flood of Kushan and other nomadic invaders. As the Shahnameh repeatedly asserts, the house of Gotarzes lost most of its members in fighting for Iran against these nomads. Obviously its great sacrifices saved the situation, for both Parthia and Hyrcania escaped the fate which the nomads dealt out to other countries of the Near East. For about 40 A.D., Kudschala-Kara-Kadphises I had consolidated the Kushan states ; while under his son Wima-Kadphises II, the Kushan power stretched from Central Asia to Benares and Gujrat on the South. The Western Satrapies and South-West Seistan were overwhelmed (Goetz, Epochen der Indischen Kultur, p. 144).

Such was the danger against which the house of Gotarzes had to strive—in some sort of collaboration, of course with the main Parthian Kingdom.

An additional factor must be taken into account which contributed to the glorification of the house of Gotarzes. As Dr. Gray (of Columbia University) has pointed out it was in the East and North of Iran that the religious tradition of Zoroastrians was formed. As a result, Median and Parthian kings, provided they struck the popular imagination sufficiently, had a chance of receiving apotheosis; but not one of the Achaemenid or Sassanide kings from the West could aspire to it. I have attempted to show in my paper on 'Azi Dahāka in History and Legend'[1] that it was King Huwakhshatara (Cyaxares) of Media who was apotheosized as Hushedar, one of the leading heroes of the Iranian millennium. He owed this greatness to his conquest of Nineveh and his success in meeting the great Scythian incursion of his day. It might be conjectured that the apotheosis of the hero Gew (of the family of Gotarzes) was to some extent due to the brave opposition which he and his family offered to the Kushan and other nomadic invasions of their time.

It is necessary to add a word regarding the artistic effect upon the Iranian epos of the grafting of the history of the Parthian house of Gotarzes upon the much older legend of Kai Khusrau which goes back to the age of the Awesta. To put the matter quite briefly, from the historical point of view, the result was hopeless entanglement and confusion of accounts belonging to widely different period. But from the artistic point of view the result has been unexpectedly brilliant—thanks to the consummate skill both of Firdausi and of the earlier ballad-mongers on whose compositions he drew. In the first place, flesh and blood was added to the meagre outlines of the wars of Kai Khusrau with which the Awesta had supplied posterity. The void left by the Awesta was filled up with stirring events from Parthian history. The bards and admirers of the Parthian dynasties and families were also gratified by the fact that the glory and exploits of these houses were clothed in the halo and prestige of an indefinitely remote past. We, too, have reason to be gratified as lovers of poetry; for the piling up of the tragedy of the house of Gotarzes on that of Siyawash and his great son has called out the full genius and powers of Firdausi and his nameless predecessors and has given them a task of immense poetic possibilities. The national poetic genius was beautifully adapted to the treatment and tracing of vendettas and tragedies; and the mixing up of knightly exploits, tragic events and stern vendettas of the houses of Kai Khusrau and Gotarzes furnished the bards with a milieu in which they could revel and an atmosphere in which the brightest as well as the most sombre colours could be employed alternately to the greatest artistic advantage.

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[1] *J.P.A.S.B.*, Vol. XXVI, 1930, page 467.

ARTICLE NO. 11.

The Sraosha Yasht: its place in the History of Mysticism.

By SIR J. C. COYAJEE.

In some earlier papers which I read before this Society I have attempted to trace the interrelations and parallelisms of the legends and cults of old Iran and China. In the present paper I shall endeavour to show how closely intertwined are the roots of the venerable mystic systems of the two countries. *Inter alia* it will appear how little ground there is for the belief that the development of Sufism was not influenced by mystic tradition of old Persia. Indeed even in an earlier paper of mine reference was made to one of the eternal symbols of eastern mysticism and there was shown the connection between the Sin-Mereg of the Bahram Yasht, the 'Sien-Ho' of the Taoist symbolism and the '*anqā* of Sufism. The Bahram Yasht and other Yasht contains much plant and bird symbolism which is of great significance in the evolution of Mysticism, e.g. the raven, the phœnix, and 'the tree of all remedies'. But the Sraosha Yasht, I submit, stands highest in the old Iranian presentation of mysticism, inasmuch as it deals exclusively and pretty fully with problem of problems of mysticism—the nature and aspects of perfect saintship. An attempt will be made here to discuss the interrelations of the mystical aspect of the Sraosha Yasht with the Taoist system on the one hand and with Sufi doctrines on the other. The analogies of the old Zoroastrian mysticism (as represented in the Sraosha Yasht) to the Taoist teaching will be found to be of great interest; and so will also be the anticipations of Sufism to be met with in that Yasht.

Regarding the exact position occupied by Sraosha in the heavenly host there has been and there is room for much speculation. He is not one of the Archangels, though he is admitted to participation in the Council of the Archangels (cf. Jackson, *The Iranian Religion*, p. 46). Nor is he an angel in the sense of being assigned the guardianship of any of the various elements in the world (*Ib.*, 47). Yet according to the Pahlavi texts he is 'the Sālār-i-dāmān-i-Hormazd' 'the leader of the creation of God'. In the Gathas he is put even side by side with Kshathra, or the Dominion of God. Spiegel has regarded him as a god of light; and Tiele considered him to be the personified abstraction of obedience. Dr. Jackson felicitously reconciles the main points of view by calling Sraosha 'a sort of priest-god, an embodiment of the divine service' (*Ib.*, p. 59). With all deference I propose to follow this idea of

Dr. Jackson a little further and to designate Sraosha as 'the saint-god' or 'as the spirit or genius of saintship'. At any rate we shall adopt this idea as a working hypothesis for our study and see how it will fit in with the descriptions of Sraosha to be found in the Yasht called after his name. But first let us paraphrase a little the title 'saint-god' which we have just adopted. In the history of theology, the priest-god or saint-god has always had a double aspect. He is sometimes the god merging into the man and the saint. On other occasions he is the saint (priest) merging into god head, and that is surely the objective of all systems of mysticism, for no system of mysticism can separate the perfect saintship from god head. The perfect saint is in a sense also admitted to the counsel of Archangels; he is a 'priest-god'; he is also the 'leader of the Divine creation'; and it is the spirit of saintship which in its eternal vigils 'guards the sleeping world'; and the Sraosha Yasht emphasizes all these aspects.

ABODE AND LOCALITY ASSIGNED TO SRAOSHA.

We shall begin by examining the locality assigned by Zoroastrian mysticism to this 'priest-god' or 'genius of saintship', and compare this locality with the situation assigned to the highest mystic power or entity in other systems of Mysticism. We get our answer from *Yasna* 57 where Sraosha is assigned a victorious house on the highest mountain top—that of the Haraiti Bareza—a house 'which is self-lighted from within and decked with stars on the outside'. The Rashna Yasht identifies the mountain as the one round which the Sun, Moon, and Stars revolve (*Yt.*, 12. 25). Fortunately, through the version of Nairyosang, the traditional view of the position of the Haraiti Bareza is known to us. Nairyosang confidently identifies that mountain with Mount Meru and thus the Avesta and traditions place the location of Sraosha by the Polar axis. The identification of the Haraiti Bareza and Meru was most probably based upon the belief in the Yashts that the sun and stars revolve round the former and the similar belief held about Mt. Meru in the Indian epics (cf. Hopkyns, *Epic Mythology*, p. 10). It might be added that in the Indian epics Mt. Meru is self-luminous just as the house of Sraosha on the Haraiti Bereza is said to be self-luminous. Again, while in the Awesta the spirit of saintship in the person of Sraosha is located by the polar axis (round which the sun and stars revolve) in the Indian epic the seven Devarshis headed by Vasishtha 'have their rising and setting as stars on Meru in the North' (Hopkyns, *op. cit.*, pp. 181-182). We see thus already a confirmation from comparative Mythology of the hypothesis with which we started that of identifying Sraosha with the genius of saintship.

It is here too that we get our first parallel from Taoist conceptions of the genius of saintship; for the Taoists also make the region of the Pole-star the location of such saintly genius. Thus we read in the Taoist tract called the 'Thai-shang' that 'there are also the spirit-rulers in the three pairs of the Thai stars of the Northern Bushel' (i.e. the Great Bear) (cf. *S.B.E.*, Vol. 40, p. 236). The idea of the mountain as found in the Haraiti Bereza is also found among the Taoists for the Thai stars are called a mountain (*S.B.E.*, Vol. 39, p. 167). Indeed the reaching of the summit of saintship by any one is described as having attained the North Pole. Thus Chwang-tse observes that Yu-Chiang got the Tao and 'by it was set on the North Pole' (*S.B.E.*, Vol. 39, p. 245). Again as regards the well-known 'Classic of the Pivot of the Jade', it is observed that its object is to teach men to discipline and refine their spirit and the name of the classic has been illustrated by referring to the North Star which is called 'the Pivot of the sky revolving in its place and carrying round with it all other heavenly bodies' (cf. *S.B.E.*, Vol. 40, p. 265). Here we have the parallel to the Awesta idea of 'Sun, Moon, and Stars going round the Haraiti Bereza'.

Here also we come upon the first traces of the influence of old Persian mysticism upon the Sufi doctrines. For the idea of the connection of the genius of saintship with the North Pole which we have traced in Sraosha Yasht and in the Taoist texts is also strongly emphasized in the Sufi system. There the great saint of any particular age is called the *Quṭb* (the Pole). This conception runs through the whole literature of Sufism. As the Sufi system developed mainly in Iraq and Khorasan which are provinces of Persia it is far more probable that it was influenced by Iranian concepts about the nature of saintship though of course the influence of Taoism cannot be neglected. In this connection it is to be noted that the Sufi doctrine of saintship was perfected by Hakim Tirmidhi (cf. Nicholson's Translation of the Kashf al-Mahjub, p. 210) and that Tirmidh was situated in Central Asia—the common focus of Iranian and Taoist mysticism.

The above consideration and some others which we shall presently adduce make it almost certain that the Sufi doctrine of Saintship (ولايت) was formed to a considerable extent under Iranian and Taoist influences. Let us take another important instance of this form what might be called the numerology of the Sufi doctrine of saintship. Thus we are told in the Kashf al-Mahjub (Nicholson's Translation, pp. 213-214) that in any age there is a certain number and hierarchy of saints. 'Of those who have power to loose and to bind there are 300 called Akhyar, and forty called Abdal, and seven called Abrar, and three called Nuquaba and one called *Quṭb*' (or Pole-star). With this let us compare the numerical configuration of the ancient mystical Chinese hall of Ming-tang which formed the Chinese conception of mystical hierarchy.

S

	4	9	2	
E	3	5	7	W
	8	1	6	

N

We shall see that the numerology here corresponds exactly in every detail to that of the Sufi doctrine of saints. We note in the plan of the Ming-tang that the head or chief pontiff of mysticism represented by the number 'one' is placed in the due north and that number represents the *Quṭb* (or North Pole of the Sufis). The numbers 3 and 7 are ranged on the right and the left of this chief figure. We remember that in the Sufi doctrine of saints these numbers represent the Nuqabā and the Abrār respectively. If we add up the numbers on the periphery of the figure we get (4 + 3 + 8 + 1 + 6 + 7 + 2 + 9) = 40 which is the number of the Abdāl. If we multiply *inter se* the numbers on each side of the square and add them we get the number of the Akhyār. Thus (4 × 9 × 2) + (2 × 7 × 6) + (6 × 1 × 8) + (4 × 3 × 8) = 300. There remain the number of Awtāds, viz. 4 which is got by taking the number of the five polar mounts and deducting one for the North Pole which has been counted already. For a good discussion of the palace of Ming-tang I would refer the reader to Marcel Granet's 'Danses et Legendes de la Chine Ancienne, pp. 116–118'.

Having now envisaged the self-illuminated and star-spangled 'house of Sraosha' as well as the Chinese mystical 'palace of Ming-tang' (as places in which the genius of saintship is enthroned in the North) we have to find a parallel in the Sufi system. This parallel is interesting enough, as we have here an Arabian contribution in the shape of a tent. The *Quṭb* (or Pole) is there in the centre to support the tent while on four sides are the four Awtād (literally pegs of the tent).

SRAOSHA AS WORSHIPPER OF THE TWO PRODUCERS AND PRESERVERS.

From the locality of this genius of saintship we turn to its functions. And the very first function ascribes to Sraosha in his Yasht renders certain the intermingling of the Iranian and Taoist conceptions of saintship. In *Yasna*, 57, I, 2 we read of Sraosha being the first to worship the not only Ahura

Mazda and the Amesha Spentas but also '*the two protectors and creators who created all creation*'. That passage has baffled commentators and can only make sense if we accept the help of the Taoist doctrine of the Yin and the Yang as the two creators; for obviously we cannot imagine Sraosha as worshipping Ahura Mazda and Ahriman. According to the Taoists all things are produced by the Yin and the Yang reflecting light on each other, covering each other and regulating each other (*S.B.E.*, Vol. 40, p. 128), and so the Yin and Yang constitute 'the two producers'. The Yin and Yang are in fact the two-fold states of the primary ether (*S.B.E.*, Vol. 40, p. 47), and the duty and delight of the perfect man is in contemplating the play of the Yin and Yang. It is in this sense only that we have to interpret the particular passage in the Sraosha Yasht for, as the 'priest-god' or 'genius of saintship' it is the task of Sraosha to watch the interplay of controlling forces like the Yin and Yang. The place given to the 'two producers and protectors' in the particular section of the Sraosha Yasht deserves to be studied in order to get any exact idea of their nature. The 'two producers' are placed not only after Ahura Mazda but after the Amesha Spentas and so they can only be regulative forces of nature parallel and similar to the Yin and Yang. It is interesting also to note the *parallelism of the order of worship* mentioned in the Sraosha Yasht and that which according to Ssema Tsien was observed by the ancient Emperors of China. The Yasht puts Ahura Mazda first, then introduces the Amesha Spentas and finally brings in the two controlling forces. In the same way the old Emperors of China worshipped first the Lord of Heaven, then the Lords of Earth and War, and after then the lords of the Yang and Yin operations (see *S.B.E.*, Vol. 39, p. 41, note 1). In this connection it is interesting to note that according to Taoist traditions the Great Bear controls Yin and Yang and we have already noted the connection of Sraosha with the regions of the Polar Star and Great Bear.

On account of the very strict monotheism prevalent in Islam no direct emphasis could be laid by the Sufis upon regulating forces like Yin and Yang. But it was not possible to shut out such speculation entirely, for dualism might almost be said to form a category of religious psychology. The Sufi writers have many doctrines which assume the Yin and Yang theory. Thus Jalaluddin Rumi observes (290):

هست سرگردان فلک اندر ز من　　همچو مردان گرد مکسب بهر زن
وین زمین کدبانوئیها مي کند　　بر ولادات و رضاعش مي تنند
پس زمین و چرخ دان ای هوشمند　　چون که کار هوشمندان مي کنند
گر نه از هم این دو دلبر مي مزند　　پس چرا چون جفت درهم مي خزند

[The sky keeps wandering (revolving) about the earth, just as men go about their occupations for the sake of their wives. Now this earth acts like a wife and exerts itself to bear children and to nurse them. Consequently, Oh wise man, you must consider the sky and the earth as intelligent beings. If these two lovers (the sky and the earth) do not enjoy each other, why do they stick to each other like man and wife ?]

This is almost a rendering of the view of the Taoist philosophers who regarded heaven and earth as the principles of Yin and Yang. Thus Chang Heng states: 'Heaven has its substance in Yang, therefore it is round and thereby moves. Earth has its substance in Yin, therefore it is flat and thereby motionless. The moved pours out and fecundates, the unmoved contracts and breeds' (A. Forke, *World-conception of the Chinese*, pp. 176-177). In fact heaven and Earth symbolized Yin and Yang in all Taoist and Confucian literature.

SRAOSHA AS RELIGIOUS TEACHER.

The Sraosha Yasht puts a great emphasis upon the capacity of the priest-god as a teacher of religion and as a repository of sound theological doctrine. He is the first reciter and student of the five Gathas (*Yasna*, 57, III, 8). He wields as his weapon the prayer Ahuna-Vairya and the Yasna Haptanghaiti and the Fšusǒ Manthra. But besides this religious equipment as the Sraosha Yasht tells us the Creator and the Archangels come forward to bear witness to the correctness of the doctrine taught by Sraosha. Obviously if Sraosha was only conceived as an angel it would be irrelevant to emphasize soundness of doctrine. No one ever suspected an angel of heretical leanings or of unsound doctrine. It is only since Sraosha is also a representative of the saint that the Yasht calls on Ahuramazda and the archangels to guarantee the soundness of his teaching (*Yasna*, 57, X, 24). For as representing sainthood Sraosha is a god-man. In fact this special divine testimony claimed for the correctness of the doctrine of Sraosha implies the existence of an esoteric doctrine taught by the representatives of the Sraosha cult which might easily have been questioned by the orthodox clergy of the day and which required for its acceptance by the orthodox public special and emphatic guarantees.

HIS 'BARSOM.'

Sraosha was not only the first of Ahura Mazda's creation is to offer prayer and to chant the Gathas but to use and spread the *barsom* (*Gray*, p. 106). The nature of the *barsom* used by him deserves attention. It was not the fairly short and ordinary barsom but 'three-stemmed, five-stemmed, seven-stemmed, and nine-stemmed. It was as tall as the knees of a man or even higher' (*Ys.*, 57. 6). This is reminiscent of Chinese beliefs regarding branches of trees which possess out of the way shapes or sizes. Students of the fourth volume of De Groot's admirable work on 'the Religious systems of China' will remember a full description of beliefs about trees and branches which attain special height or shape. Similarly while the '*barsom* used ordinarily is about nine inches long only, Sraosha is made to use barsom which is much taller—as high as a man's knee and even bigger. Then we turn to the fact of the large number of branches possessed by the *barsom* used by the holy Sraosha. Obviously, plants possessing so many branches and branches of which the number corresponds to the standard mystical numbers (3, 5, 7, 9) were believed to possess special efficacy; or, as the Chinese would put it, such vegetation would be possessed of much 'soul substance' and 'vital power' (cf. De Groot, *The Religious system of China*, Vol. I, pp. 295–300). That would at least follow from the notions entertained by the Chinese about the mystic influences leading to extraordinary shapes and sizes in vegetation. It need hardly be pointed out that the numbers ascribed to the branches of the barsom mentioned in the Yasna are specially important in Chinese mysticism. For one thing the numbers symbolize progress in mysticism and the several degrees of mystical attainment. Thus we read in the sixth book of Chwangtse (para. 8) that the initiate was able after *three* days' study to banish all worldly matters from his mind, after studying *seven* days to banish from his mind all thoughts of men and things; and after *nine* days he was able to count his own life as foreign to his true self. In fact the numbers mentioned in the Yasna regarding the *barsom*-branches employed by Sraosha are symbolical of the gradations in the growth of mysticism (*S.B.E.*, 39, 246). It might be added that the odd numbers 1, 3, 5, 7, 9 also represented the heavens (as opposed to the Earth) in Chinese mystic system (cf. Forke, *Geschichte der alten Chinesischen Philosophie*, p. 179).

THE CHARIOT OF SRAOSHA AND HIS DAILY PEREGRINATIONS.

We might now suitably bring in a study of the peregrinations of Sraosha over the world and of the corresponding points in Taoist and Sufi doctrine. As Sraosha is connected with the region of the Pole-star and the constellation Great Bear, and as this constellation goes round the star in twenty-four hours we can see how the idea of the daily peregrination of Sraosha over the Earth arose. The Taoists have a similar idea of the great Imperial ruler of heaven being in the Pole-star, and the seven rulers in the constellation Great Bear going around it daily. 'Revolving around the pole it descends to rub the four quarters of the sphere and to separate the Yin and the Yang; by so doing it fixes the four seasons, upholds the equilibrium between the five elements; moves forward the subdivisions of the sphere, and establishes all order in the Universe' (De Groot, *The Religious system of China*, Book I, p. 317). We might also refer to the idea expressed in the book 'Shang Kan Ying Pien' to the effect that the spirit lords of the Pole-star review the happenings on the Earth and report to heaven all the transgressions of mankind.

But while the idea of the daily peregrinations of Sraosha has such interesting parallels in Taoism it is best carried forward in the Sufi tradition. We note that in the Yasht Sraosha goes over the Earth in car drawn by four swift steeds. Similarly the Kashf al-Mahjub says: 'It is well known among Sufis that every night the Awtad must go round the whole universe, and if there should be any place on which their eyes have not fallen next day some imperfection will appear in that place; and they must then inform the *Quṭb*, in order that he may fix his attention on the weak spot, and that by his blessing the imperfection may be removed' (Nicholson's translation, p. 228). In the Sraosha Yasht four fleet steeds carry Sraosha over the universe, while the Sufi tradition gives him four subordinates for surveying the world. But it is not only vicariously that the *Quṭb* (Pole-star) surveys the world; for there are many anecdotes of Sufis having encountered the *Quṭb* during his peregrinations on the Earth.

The origin and character of the chariot of Sraosha is also made clearer by a reference to Chinese analogues. For the whole conception of a chariot going round the world arose from the shape of the constellation Great Bear which can be conceived as that of a car; and in fact in Chinese tradition the Great Bear does form the chariot of the Emperor of Heaven. There is a passage in *Yasna*, 57, XI, 29 of which the meaning is much disputed and on which some light might be thrown by a reference to the Chinese parallels. In the passage in question the movement of Sraosha from India in the East towards the West is described. Here the real reference might be to the succession of the seasons which are governed by the Yin and the Yang. 'When the tail or handle of the Great Bear points to the East (at nightfall) it is spring to all the world and when it points to the west it is autumn,' Prof. Adolf Forke has given us a pretty full description of the alternation of the Yin and Yang during the seasons and according to the points of the compass. 'At the winter solstice, the "Bushel" points direct north, the Yin fluid has reached its climax, and the Yang fluid begins to grow.... At the summer solstice the "Bushel" points direct south' (Forke, *The World-conception of the Chinese*, pp. 177–183). Thus the reference is probably to the causation of the seasons by the forces of Yin and Yang or of 'the two

यह पुस्तक वितरित न की जाय
NOT TO BE ISSUED

producers and preservers'—to quote the language of *Yasna* 57.

So far we have been dealing with the movements of the car of Sraosha as described in the Yasht and their Chinese parallels. But it is even more apt and interesting to find that in ancient China as in old Iran the main function of individual saints as well as of the genius of saintship was to peregrinate the world with the aim of regulating it and of guarding it against harm. It is obvious that the peregrinations of Sraosha from far off India in the east to the west, as described in the Yasht, were for regulating the world's affairs in his capacity of the commander and guardian of the universe ('Salar-i-daman-i-Hormazd'). On the Taoist side we have copious analogues of this; and, indeed, apart from other Taoist writings Book XI, Part 2, Section 4 of Chwang-tse by itself supplies numerous examples. Thus the great sage Kwang Chang-tse
ho *lived at the highest points of the Great Bear* is made to say
Since t ed about the methods of regulation of the universe,
years how ca with you to the summit of the Grand Brilliance,
of the bright and expanding

TRACES OF ESOTERIC DOCTRINE IN Deepest Obscurity,

We have seen earlier that the Yasht claims spe ng. There
sanction and guarantee for the correctness of the doc Yin and
the Sraosha cult—a course for which there is no paralle 99).
any of the other Yashtas (*Yasna*, 57, X, 24). It was also noted that the history of mysticism showed numerous instances of such claims. Thus, while some eminent Sufis avowed and gloried in their heterodoxy (كفر) others made energetic efforts to force their Sufi doctrine within the framework of orthodoxy (شريعت). Similar efforts we note were made in Europe by mystics like Swedenborg. We now proceed to inquire whether the Sraosha Yasht exhibits any doctrines which might
These doubts among the orthodox and which would only be
saints. The same work speaks of and there seems to be
Tao as 'one who mounts on the ether of heaven and earth in its normal operation and driving along the six elemental energies of the *changing seasons*, thus enjoying himself in the illimitable' (*Ib.*, p. 169). These Taoist parallels might usefully suggest to us that the four steeds of Sraosha were meant also to represent the energies of the four seasons.

SRAOSHA AS THE PROTECTOR OF SAINTS.

Let us now turn to another important function of Sraosha. In *Yasna*, 57, IV, 10 Sraosha is described as constituting a strong house for the 'Drighaoshcha Drivyaoscha'—translated often as poor men and poor women. But looking to the veneration with which the word درويش (Darwish) has been looked

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NOT TO BE ISSUED

upon in Persia and Central Asia for countless ages we might translate it as 'Saints, male and female'. And here there is no lack of parallel Taoist texts for the verse which we are examining and which emphasizes the fact that Sraosha builds a mighty house for the saints especially after sunset. Thus we read in Chwang-sze that 'the perfect men of old trod the path of benevolence as a path which they borrowed for the occasion, and *dwelt in Righteousness as in a lodging which they used for a night*' (*S.B.E.*, Vol. 39, p. 356) and this old but poetical idea was ever present with the great Sufis. Thus Sultan Abu Said Abul-Khair, the eminent Sufi, observes :

شب خیز که عاشقان به شب راز کنند　　گرد درو بام دوست پرواز کنند
هر در که بود وقت شب در بندند　　الّا در دوست را که شب باز کنند

(Awake at night for the saints study secrets of mysticism at that time and fly about the gates and roof of their Friend place ; night every other gate is closed except that of that he may Friend which is then opened.) that by his blessing

So the conce be removed' (Nicholson's translation, the Ta the Sraosha Yasht four fleet steeds carry Sraosha suspect universe, while the Sufi tradition gives him four sub- es for surveying the world. But it is not only vicariously that the *Quṭb* (Pole-star) surveys the world ; for there are many anecdotes of Sufis having encountered the *Quṭb* during his peregrinations on the Earth.

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As the heir of the old Iranian and, to some extent, of Taoist traditions Sufism also claimed powers and methods of Juvenation. And the great mystic Jalaluddin Rumi has expressed this clearly and forcibly :

دایما ترو جوانیم و لطیف   تازه و شیرین و خندان و ظریف
پیش ما صد سال و یکساعت و یکیست   که دراز و کوته از ما منفکی است
چون نباشد روز و شب با ماه و سال   کی بود سیری و پیری و ملال

(We, i.e. the Saints, are always fresh and young, sweet and smiling. To us a hundred years are no more than an hour since 'long' and 'short' are ideas quite remote from us. Since then with us there are no night and day or months and years how can we become tired, old or worn out?)

TRACES OF ESOTERIC DOCTRINE IN THE YASHT.

We have seen earlier that the Yasht claims special divine sanction and guarantee for the correctness of the doctrines of the Sraosha cult—a course for which there is no parallel in any of the other Yashtas (*Yasna*, 57, X, 24). It was also noted that the history of mysticism showed numerous instances of such claims. Thus, while some eminent Sufis avowed and gloried in their heterodoxy (کفر) others made energetic efforts to force their Sufi doctrine within the framework of orthodoxy (شریعت). Similar efforts we note were made in Europe by mystics like Swedenborg. We now proceed to inquire whether the Sraosha Yasht exhibits any doctrines which might arouse doubts among the orthodox and which would only be accepted under special divine sanction; and there seems to be a fair number of such views. For one thing the very text which begins *Yasna* 57 must have become a controversial matter—for there Sraosha is shown as worshipping Ahura Mazda, the Amesha Spentas and the 'two producers and preservers' (corresponding to the Taoist Yin and Yang). This implied a special teaching about cosmogony unknown to other cults of Iran. In fact here we have the beginnings of that give-and-take between old Iran and China which eminent scholars have been studying recently. Nor was this all. The doctrines of the Sraosha Yasht show a certain tendency—worthy again of a lofty mysticism—of confining worship to Ahura Mazda. His attributes (the Amesha Spentas) and the 'two producers and protectors' and of neglecting by implication all angelology and mythology. We note also that the texts which Sraosha recites and employs are confined to the Gathas, the Ahuna-Vairya and the Yasna Haptanghaiti : none of the litanies to the minor angels are mentioned. Through the Sraosha Yasht again no other angel is even mentioned except Haoma and Arshlat and this angel enters only to pay homage to Sraosha. In fact we have here a reversion to the Gathic type of mysticism on the one hand, and we have great parallelism with the Taoist mysticism on the other. As one of the oldest works on Taoism put it. 'The saint forms a trinity along with the heavens and the earth ; he stands on an equal footing with the great spirits and with their help regulates the administration of the world (Forke, *op. cit.*, p. 178). So Sraosha—the spirit of saintship—is the equal of archangels and he is the guardian angel of the world. Lastly, attention has been drawn to the fact that the Sraosha Yasht has a system of mystic numbers allied to the old Chinese system.

SRAOSHA AND WEN-TCHONG.

In the above discussion we have noticed the close analogy between the different attributes and functions of Sraosha and those of the loftiest saintship of Taoism and Sufism. We can now go a little further and investigate a curiosity of comparative mythology by studying and comparing the functions of Sraosha and the Taoist deity Wen-tchong (otherwise called Lei-tson). The reader will find a good summary of the functions and character of Wen-tchong in Father Doré's '*Superstitions en Chine*', Part II, Vol. 10, pp. 682–685, or he might turn up Grube's translation of Feng-Shen-Yen-I for a similar account. We note first that Wen-tchong is like Sraosha 'the great preceptor'. He is also identified with the Great Bear and we have seen the close connection of Sraosha (with his seat on Haraiti Bereza) with the region of the Pole-star. Sraosha, as we know carries 'the club uplifted' as his weapon (*Yt.*, 11, 12). Correspondingly, Wen-tchong has a white hatchet which he bears erect when marching to spiritual combats. Further, it is added that Wen-tchong keeps traversing the world seated on an animal which can go thousands of miles in the twinkling of an eye. This agrees very well with Sraosha's peregrinations of the earth on his four quick coursers. Finally, Sraosha is the protector of the houses of the faithful (*Yt.*, 11, 20). That reminds us that the name of Wen-tchong (viz. Lei-tson) is written in most Chinese houses on the lintels of doors as a pressing talisman. I believe, I am right in saying that the similarity of Sraosha to Wen-tchong forms a curiosity of comparative mythology, and I have pleasure in bringing it to the notice of Iranists and Sinologs respectfully and in requesting them to devote further study to it.

THE SPIRIT AND ATMOSPHERE OF THE YASHT.

We have seen that the Yasht embodies the ideals and aspirations of the mystics of old Iran, and its general atmosphere of the Yasht corresponds to this suggestion. True, the angel Sraosha is described as a warrior but he smites great demons in order to protect a few humble saints and travellers. The angelic pomp and circumstance, the personifications of nature's might in which other Yashts are so rich is eminently wanting in this Yasht. The entire human personnel of this Yasht consists of a few saints and travellers whom Sraosha protects, besides the inmates of the houses where he has been honoured and his faithful disciples have been well-received. Of royal or heroic power and glory we hear nothing. For the angel of saintship can suitably hold communion, on the one hand, with the archangels, and on the other hand with meek and lowly saints and those who receive them in their houses; but he has little enough to do with earthly kings or warriors. The *personnel* and atmosphere of the Yasht thus correspond with what we would expect if Sraosha was, as we have suggested, the genius of saintship.

It is also noteworthy that it is in this particular Yasht that we meet with the closest analogies and parallelisms with the ideas and imagery of the Gospels. When we read (*Yt.*, 11, 20) of 'the houses protected by Sraosha, where the holy Sraosha is dear and friendly treated and satisfied as well as the faithful man' (or the saint), we are irresistibly reminded of *Matthew*, X, 40-41 and 13: 'He that receiveth you receiveth me, and he that receiveth me receiveth him that sent me'. 'And if the house be worthy let your peace come upon it'. Again, corresponding to the claim of Jesus to be 'the good shepherd' we have in the Sraosha Yasht an apothesis of the shepherd's dog (*Yt.*, 11, 7) where the dog is compared with the angel. 'And therefore we take round us the holy-natured Sraosha, the holy, the friend-smiter, as one does with shepherd's dogs.' I claim that in no piece of literature whether sacred or profane has man's faithful canine friend received such an apotheosis or even justice as in this Yasht. For after all even the good shepherd can do little to save his flock from the wolf without the powerful assistance of his dog. When again we hear Sraosha described as 'the incarnate Word' (*Yt.*, 11, 18), we come across another striking analogy with the 'saint-god' described in the Gospels. But, to conclude, do not these striking parallels found in the Yasht with the spirit and even the phraseology of the Gospels show that the subject of both compositions is the ideal of saintship on Earth—the 'Saint-god' in fact?

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ARTICLE No. 12.

Persian painters, illuminators, and calligraphists, etc. in the 16th century, A.D.

By M. MAHFUZ-UL HAQ.

'Persian book illustrations—which represent almost all that is best in this delicate art—are so intimately connected with Persian literature,' writes Sir Denison Ross, 'that most of the spade work in regard to its appreciation and interpretation has perforce to be done by scholars who have devoted their lives to Islamic literature, notably the historical and poetic products of Persian writers. For we are dealing with a history which still remains to be written for the Europeans, and with a literature which exists for the most part only in rare manuscript copies. Before the art critic can set about his work of technical analysis, the Orientalist must explain the political conditions under which the Persian artists worked.'[1] To this, I should like to add that even for the biography of these Persian painters the Orientalist has to come to the rescue of the art critic. The books which contain the biographies of the Persian painters are mostly in manuscript and unless their contents are made known to the art critic the history of painting in Persia will remain incomplete and untrustworthy.

Among the manuscripts which contain a valuable account of Persian painters, illuminators, and calligraphists, is the very interesting *Tuḥfa-i-Sāmī*, a biography of the contemporary poets, of Prince Sām Mīrzā, a son of Shāh Isma'īl, the founder of the Ṣafavid dynasty of Persia. Sām Mīrzā was a scholar, poet, and a patron of letters. Born in 923/1517, he passed two years of his early life (928–930, A.H.) at Herāt, the city of light and learning. There, he held the post of a titular governor under Shāh Isma'īl, his father. But on the accession of Shāh Ṭahmāsp, his elder brother, he was apparently relegated to a position of inferiority. In 969/1561-2 he rebelled against Shāh Ṭahmāsp and was soon cast into prison. He remained in prison till 984/1576-7, when he was put to death on the accession of Shāh Isma'īl II.

Sām Mīrzā wrote the *Tuḥfa* in 957/1550-1, dividing it into 'seven' *Ṣaḥīfas*, or sections. The *Tuḥfa* contains biographies of the contemporary poets and, in view of the unique position of its author and also in view of the fact that he came in personal contact with quite a good number of poets whom he has mentioned in the book, the value of his account can hardly be over-estimated.

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[1] Introduction to M. Blochet's *Musulman Painting*, (London, 1929), p. vii.

Among the persons noticed in the *Tuḥfa* are a number of painters, penmen, and illuminators whose life-history is of particular interest to us. In the list of 'Painters' we get the notices of such distinguished artists as Mīrak, Malik Qāsim, Mānī Shīrāzī, and Shāh Qulī, whose biographical sketches though brief are nevertheless valuable. An instance or two will prove my point. It is usually asserted that Mīrak died during the reign of Muḥammad Khān, the Shaybānī ruler of Bukhārā, (d. 1510, A.D.), but the fact is that he survived him by forty years at least, for he was alive at the time of the composition of the *Tuḥfa* (i.e. in 1550, A.D.) and was in fact 'the leader and guide of the artists of the Court of Shāh Ṭahmāsp'.[1] Similarly, we learn for the first time (from the *Tuḥfa*), that an introduction to an Album of Bihzād's paintings was written by Amīr Sulṭān Ibrāhīm,[2] a scholar and a chronicler of the age. Was this album different from the one whose introduction was written by Khwāndmīr, the author of the *Ḥabīb-us-Siyar*? Probably it was, but the matter requires further investigation.

The account of the calligraphists also is extremely important as it contains the life-sketches of such celebrated penmen as 'Alī al-Kātib, 'Abdullāh Marwārīd, Shāh Maḥmūd, Sulṭān 'Alī, and others. It is usually asserted about the first named calligraphist (i.e. 'Alī al-Kātib) that he died in 924, A.H., but Sām Mīrzā tells us definitely that he was alive in 957, A.H., which fact is further proved by the extant specimens of 'Alī's calligraphy.[3]

The 'extracts' which have been given in the following pages contain the notices of: (i) Painters, (ii) Gilders and Illuminators, (iii) Book-sellers, Book-binders, Paper Merchants and Dealers in Chinese pottery, (iv) Inscribers on stones, and (v) Calligraphists.

In preparing these notes I have made use of the following three manuscripts of *Tuḥfa-i-Sāmī*:

(i) MS. No. 682 in the Oriental Public Library, Patna, which was copied in 968, A.H., or 16 years before the death of the author.
(ii) MS. No. 683, in the same library, which was copied on the 17th Jumāda II, 971, A.H., or 11 years before the author's death.
(iii) MS. in the Government collection of the Asiatic Society of Bengal. The MS. does not bear the

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[1] *Tuḥfa-i-Sāmī*, (A.S.B. MS.), fol. 46b.
[2] *Ibid.*, fol. 31a.
[3] See my *Specimens of Muslim Calligraphy in the Ghosh Collection*, (Calcutta, 1927), pp. 6–8.

date of transcription but appears to have been copied by a contemporary.

Here follow the ' extracts ' from the *Tuḥfa* :

A. PAINTERS.

1. PRINCE BAHRĀM MĪRZĀ. He was famous in the realm of calligraphy, more particularly in *Nasta'līq*. He was peerless in the art of *Ṭarḥ* (i.e. designing of arabesques), poetry, riddles, and music.[1] He died in 956, A.H.

2. SHAYBAK KHĀN.[2] In spite of his Turkish origin and mean traits, he was highly skilled in various arts. He used to retouch, with the brush of correction, the paintings of a ' master ' like Bihzād—a painter whose peer has not been drawn by the Painter of Creation, since (the day) He drew the first picture of human beings on the Tablet of Existence. He also drew, with the point of his ancestral pen, the line of annulment on the handwriting of Mawlānā Sulṭān 'Alī of Mashhad—a calligraphist whose equal has not been inscribed on the pages of existence by the pen of Kirāman Kātibīn. He used to ask the former (i.e. Bihzād), ' Draw in this manner ', and instruct the latter (i.e. Sulṭān 'Alī), ' Write in this way '.

3. MĪRZĀ SHĀH ḤUSAIN, son of Shāh Beg, was the Wālī of Sind. It is said that he had some proficiency in painting.

4. SAIYYID 'ABDUṢ ṢAMAD, of Kāshān. He wrote under the pen-name of 'Aṭā'ī. He was a master of drawing, painting,[3] and gilding.

5. 'AQĀ MĪRAK, the painter. He is descended from the Saiyyids of Iṣfahān. He is unrivalled in painting and outline-drawing (*ṭarrāḥī*). At the present moment (i.e. 957, A.H.), he is the leader and the guide of the artists of the Court of Ḥaḍrat Ṣāḥib Qirān (i.e. Shāh Ṭahmāsp).

6. MALIK QĀSIM, the painter. He comes from Shīrāz. The only defect that one could notice in him was that he claimed descent from Shāh Shujā' of Kirmān. He was a good painter and wrote a beautiful hand in all the *Qalams*. He was a master of the art of letter-writing and possessed extraordinary proficiency in Riddles and Prosody. His memory was so good that if thirty verses were read out to him, even once, he could reproduce them from memory. But he was very unlucky and was unable to draw any advantage from his (extra-

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[1] I have omitted unnecessary details and quotations of verses.

[2] Shaybak (or, Shaybānī) Khān was killed in a battle against Shāh Isma'īl (the father of the author) at Ṭāhirābād, in A.D. 1510.

[3] In the A.S.B. MS. ' painting ' is omitted.

ordinary) talent. He died in his youth in 947/1540-41. He complains against the world in the following *Rubā'ī* :—

روزی عجب است و روزگاری مشکل   کز دهر صفـا گشته بکلّی زایل
خالی ز غبـار یکدگر یکساعت   چون شیشهٔ ساعت نتوان یافت دو دل

7. **Māni of Shirāz.** At first he passed his days as a goldsmith but later, when he had acquired fame as a poet and a man of refined taste, he entered the circle of soldiers—a circle from which no one has come out in perfect safety. He rose to a high position in the early days of the Ṣāḥib Qirān, but, as the proverb runs : 'Diamond cuts diamond', the arrow of his Fortune was, when it had just reached the bow-house of Prosperity, struck with the arrow of (Royal) wrath. This happened at the instigation of Amīr Najm, the goldsmith. He wrote the following *Ghazal* at the time of his departure...... His grave is in the cemetery of Surkhāb, in Tabrīz. As he was unrivalled in painting (*Muṣawwirī*) and peerless in drawing (*Naqqāshī*), his verses also are not void of fineness.

8. **Amīr Dūsti**, the painter. He is one of the jesters and libertines of Yazd. He is also the leader of the men of ardour and love. He was gifted with a fine intellect and possessed good manners.

9. **Qadīmī**, the painter. He belongs to Gīlān. He is good in painting, but in poetry also he does not consider himself inferior to others.

10. **Ustād Shāh Qulī**, the painter. He comes from the town of Qum. He knows painting and geomancy. He considers himself unrivalled as a poet, and writes under the pen-name of *Alwānī*.

11. **Dīwāna**, the painter. He comes from the town of Tabrīz. It is said that he was a companion of Sulṭān Ya'qūb.

12. **Nabātī** of Tabrīz. He passes his days in painting and *lapis lazuli* work.

13. **Shaikhī** of Kirmān. He was unrivalled as a painter and was also perfect as a Mullā.

B. Gilders, Illuminators, etc.

1. **Mīr Shukrī.** He was a Saiyyid of Shīrāz. He knows book-binding and *lapis lazuli* colour work. It is said that he can play the musical instruments also.

2. **Ḥāfiẓ Majlisī.** He comes from the city of Tabrīz. He knows the Qur'ān by heart and is not bad in playing the Qānūn and Shiturghū. He also knows *naqqārī* and calligraphy. Besides these, he claims proficiency in twenty other arts as well.

3. **Nigāhī.**[1] His original home was Chaghtā. He was

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[1] In the A.S.B. MS. the name appears as تکلیقی .

a young and importunate lover. He was highly skilled in such arts and crafts as inlaid work and ornamentation (*naqqāshī*).

C. BOOK-SELLERS, BOOK-BINDERS, PAPER-MERCHANTS, AND CHINA-WARE DEALERS.

1. MAWLĀNĀ QĀ'IMĪ of Tabrīz.[1] He passed his days in copying manuscripts. He was also a book-seller.
2. MAWLĀNĀ ZĪNATĪ. He was a paper-merchant.
3. MAWLĀNĀ 'ABDĀL of Kāshān. He is a paper-merchant.
4. MAWLĀNĀ FUNŪNĪ of Iṣfahān. He knows something of book-binding, but he is a libertine and a vain babbler.
5. 'ISHRATĪ QALANDAR. His birth-place is not known. He has some knowledge of book-binding.
6. FIKRĪ of Astarābād. He earns his livelihood as a book-binder.
7. ZĀTĪ of Lār. He is engaged in the profession of book-binding at Tabrīz.
8. MAWLĀNĀ MUJALLID. He belongs to Khurāsān and passes his time in book-binding and love-making.
9. MAWLĀNĀ RAMAḌĀN. He adopted the pen-name of *Fānī*. He is one of the poets of Astarābād and works as a book-binder.
10. QARDĀDMISH. He sells China at Tabrīz. His face was more beautiful than the petals of rose and the freshness of his cheeks was an object of envy even for the sun and the moon.

D. INSCRIBERS ON STONES.

1. 'ISHQĪ of Tabrīz. He is good in Riddles. He is also skilled in inscription work.
2. MAWLĀNĀ NIẒĀM. He is a Ḥāfiẓ at Imāmzāda 'Abdul 'Aẓīm. He knows the art of inscribing on stones.
3. FARDĪ of Tabrīz. He is good in Riddles and also in inscription work on stones.

E. CALLIGRAPHISTS.

1. EMPEROR HUMĀYŪN (of India). His handwriting was perfect.
2. AMĪR ṢADR-UD-DĪN MUḤAMMAD. He comes from Ashkūr, a village in the suburbs of Tabrīz. He is a Mawlawī and writes good *Naskh* and *Ta'līq*.
3. SAIYYID MUẒAFFAR, *Ṭabīb*. He belongs to Kāshān. He is a trader and is well known as a bow-maker and a calligraphist.

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[1] The O.P.L. MS. has Khātimī and omits: 'He passed his days in copying manuscripts.'

4. Saiyyid Ḥasan Wā'iẓ.[1] He is a Saiyyid of Shirwān. He is good in *Inshā* and his calligraphy is attractive. He writes under the pen-name of *Faiḍī*.

5. Amīr Ibrāhīm, the Qānūn-player. He is proficient in various arts and writes a beautiful hand. He plays the Qānūn in the style of Khwāja 'Abdullāh. His notes are very melodious.

6. Mīr Thānī. He is one of the exalted Saiyyids of Nīshāpūr and is well-known on account of his good nature and fine intellect. He is a master of Prosody and his calligraphy, more particularly the *Nasta'līq*, is very good.

7. Mawlānā Kamāl-ud-Dīn Ḥusain. He is the son of Mawlānā Ṣadr-ud-Dīn 'Alī, the physician. He was a great physician—a Messiah in the science of *Hikmat*. He had raised the standard of superiority in various arts and sciences. His handwriting drew the line of annulment on the *Ta'līq* writings of the masters (of calligraphy). He died in 953, A.H.

8. Mīr 'Alī al-Kātib. He is a Saiyyid of Herāt but he was brought up in the holy city of Mashhad. He practised the art of calligraphy under Mawlānā Sulṭān 'Alī and, in fact, surpassed him. No one has excelled him in *Nasta'līq* calligraphy. Owing to the disturbed condition of Khurāsān, he went away to Transoxiana in 935, A.H. It is reported that at present his eyesight has become weak and, in consequence, his calligraphy also has deteriorated.

9. Khwāja Muḥammad Mu'min. He is the son of Khwāja 'Abdullāh Marwārīd. He is the Ya'qūt and the Ṣairafī (of his age) and a *nāsikh* (i.e. the annuller) of the writings of the ancient and the modern masters (of calligraphy). He is a master of *Thulth* and *Naskh* styles of writing.

Qita' :

Every attractive line which is accepted as the model of beauty,
Has been inscribed on his illuminated pages.
Every letter written by him is a pearl from the treasure-house of meaning,
Where is Ṣairafī ? Let him come and appraise the value of his (i.e. Mu'min's) pearls.

If I narrate only a fraction of his many excellences, it would cover a whole volume. I have taken lessons from him and the little that I know is through his kindness. He was in my company at Herāt and Shīrāz and held the office of Ṣadr. Subsequently, he began to live with Ḥaḍrat Ṣāḥib Qirān (i.e. Shāh Ṭahmāsp), but, later on, went away to India where he died in 948, A.H.

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[1] In the A.S.B. copy Amīr 'Ajabī is styled as a calligraphist while the name of Saiyyid Ḥasan Wā'iẓ is omitted.

10. KHWĀJA SHIHĀB-UD-DĪN 'ABDULLĀH, *Bayānī*, who is known as Marwārīd, or 'the Pearl'. He is a pearl from the shell of Khwāja Muḥammad Kirmānī, his father. A Timurid ruler sent him as an ambassador to Quṭaif and Baḥrain, from where he brought, on his return, some very fine pearls for presentation to the King—it was for this reason that he was given the title of Marwārīd...... His fingers have drawn a line of annulment on the *Riqā'* and the *Tawqī'* writings of the gold—penned masters (of calligraphy):

> 'No one has written *Thulth* like him, except Ya'qūt.'

He was an expert in playing on the *Miḍrāb*.... In his youth, he entered the service of Sulṭān Ḥusain Mīrzā and gradually rose to the position of an Amīr of the Court. On the death of the Sulṭān, he retired from the court and engaged himself in copying the Qur'ān. When the late Ṣāḥib Qirān (i.e. Shāh Isma'īl) visited Khurāsān, he came out of his seclusion, but soon retired from service on account of an attack of *abila-i-firang*, or *Morbus galliens*. The 'Afshān' powder was invented by him. He died in 922, A.H.

11. MAWLĀNĀ ASHRAF. He belongs to Ḥarzabīl in 'Irāq. He writes a good hand and possesses certain excellences.

12. MAWLĀNĀ FAQĪH. He was a good-natured and Darwīsh-like person, and was a great admirer of Jāmī. Most of the books of the poet (Jāmī) are in the handwriting of the aforesaid Mawlānā.

13. MAWLĀNĀ SULṬĀN 'ALĪ. He is so famous for his *Nasta'līq* calligraphy that it is unnecessary to write anything in his praise. . . . Although his age has exceeded sixty, yet he could write a very attractive hand. He has himself composed these two *Mathnawī* verses in which he says:

> 'My age is sixty-three years, more or less,
> But my musk-coloured pen is still young.
> I can still write in *Khafī* (minute) and
> *Jalī* (bold) characters:
> That I am the slave (of God) Sulṭān 'Alī.'

14. ḤĀFIẒ 'ALĪ. He belonged to the Ghūrī family of Herāt. He was famous for his good disposition and fine intellect. He wrote a beautiful hand in several styles.

15. MĪRZĀ QĀSIM, called *Madhkūr*. He is acknowledged as a master of calligraphy...... He was killed by the Turks at Herāt in 932, A.H.

16. MAWLĀNĀ SHAMS-UD-DĪN MUḤAMMAD of Kāshān. He is a young man. Besides being skilled in various arts, he is particularly proficient in Calligraphy, Rhyming, and Riddle. He has adopted the pen-name of *Nawā'ī*. While he was proceeding to India, he wrote the following *Qiṭa'*:

'I must proceed to India, as there
The affairs of the artists prosper.
Generosity and munificence have departed from the
people of the world
And gone to the Dark Land (of India).'

17. Mawlānā Muḥammad. He was the son of Mawlānā Sulṭān Muḥammad of Astarābād. He was a very intelligent and capable youngman. He wrote a beautiful hand. He had been a student for sometime and wrote under the pen-name of *Mashrabī*. He died in the prime of his youth.

18. Mawlānā Faḍlī.[1] His birth-place is Qazvīn. He is one of the Mullāzādas of the place. His handwriting is beautiful. He is a popular figure in society.

19. Mawlānā Shāh Maḥmūd of Nīshāpūr. His magic-like *Qita's* give light to the eyes of the houris. He is a pupil of Mawlānā 'Abdī, but he has surpassed him in calligraphy. In spite of his great skill, he lives like a darwish and a faqir. He adopted the pen-name of *Mukhliṣ*.

20. Mawlānā 'Abdī. He is the maternal uncle of Mawlānā Shāh Maḥmūd and a pupil of Mawlānā Sulṭān 'Alī of Mashhad. In spite of his old age he wrote an excellent hand.... For a long time he enjoyed the honour of the service of Ḥaḍrat Ṣāḥib Qirān, and two years ago (i.e. in A.H. 955) he departed to the eternal home.

21. Mawlānā Anīsī. His original home is Khwārazm. He used to live with Sulṭān Ya'qūb. He wrote such beautiful *Nasta'līq* that people considered him to be a rival of Mawlānā Sulṭān 'Alī of Mashhad. In fact he has carried this (i.e. *Nasta'līq*) calligraphy to the boundary of magic.

22. Mawlānā 'Abdul Karīm Pādshāh. He is the brother of Mawlānā Anīsī. He got the name of 'Pādshāh' as, owing to mental derangement, he styled himself as Pādshāh, or the King, and gave strange orders to the people. However, he was a faqir and did not do harm to anybody. He wrote beautiful *Nasta'līq* in the style of his brother. In the end, he began to write on his *Qita's:* 'Written by Khudā, or God', or 'Written by Razzāq, or the Sustainer' (i.e. God), but usually he wrote, 'Written by Pādshāh, or the King'.

23. Ḥāfiẓ Bābā Jān. He belongs to Turbat, in Khurāsān. He wrote a beautiful *Nasta'līq* hand and was highly skilled in engraving and gilding on bones.[2] Among the musical instruments, he played so well on the 'Ūd and the Shiturghū that no one has, in my opinion, surpassed him. He was very polite and darwīsh-natured. He had a fine taste for Prosody and Riddles. He died at Tabrīz in A.H. 944.

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[1] His account is omitted in the A.S.B. MS.

[2] In the A.S.B. MS. 'engraving and gilding on bones' omitted.

24. MAWLĀNĀ MĀLIK. He comes from Tabrīz, but some say that he belongs to Qazvīn. He wrote a beautiful hand in several styles. He has a perfect knowledge of music and poetry and is not bad in riddles as well.

25. MAWLĀNĀ IBRĀHĪM. He comes from Astarābād. He writes a very good hand in several styles and is particularly proficient in *Ta'līq*.[1] It was for this reason he held the post of the Munshī of the shrine of Imām Riḍā, at Mashhad. May peace and benedictions be on the dwellers of that city.

26. MAWLĀNĀ DŪST MUḤAMMAD of Kūshwān. Kūshwān is a village in the vicinity of Herāt. The Mawlānā is young, amiable, and jovial. He writes beautiful *Nasta'līq*. He also possesses proficiency in Poetry, Prosody, and Riddles. At times he engages himself in *Ṣaḥḥāfī* (book-binding) also. His pen-name is *Kāhī*.

27. MUḤIBB 'ALĪ, the flute-player. He comes from Herāt. He plays the flute nicely and writes good *Nasta'līq*. He has lived in my company for a long time.

28. MAWLĀNĀ MAJNŪN, the *Chap*-writer. He is one of the witty people of Herāt and is without a rival in the world in *Chap* calligraphy. He had invented a new style of calligraphy and named it *Khaṭṭ-i-Tawāmān*. The style of this *Khaṭ* was such that he made two figures with his pen and these two verses could be read in them...... He wrote a versified *Risāla* in my name in the metre of *Lailā-wa-Majnūn*. He had discussed therein the rules of calligraphy, the quality of the pen that should be used, the process of colouring the paper, and other allied subjects. I remember the following verse (from the *Risāla*) regarding the colouring of paper :

> The colour which makes the letters shine,
> Is the water of Ḥina and Saffron.

29. MAWLĀNĀ BANĀ'Ī (or, Bannā'ī). His birth-place in Herāt. He adopted this pen-name as he was the son of a mason. He was well-known for his *Taṣawwuf*, fine penmanship, jovial temperament, and good recitation. He has composed a number of *Risālas* on music and *Adwār*, a branch of Mathematics.

30. SHAWQĪ of Yazd. He is one of the descendants of Khwāja Rāshid. He is an agreeable companion and very human. He writes a beautiful *Nasta'līq* hand. He is perfect in *Inshā* and held the post of *Inshā nawīs* under me.

31. MAWLĀNĀ AḤMAD ṬABASĪ, known as Mawlānā Aḥmad Tūnī. He was the tutor of Ḥaḍrat Ṣāḥib Qirān (i.e. Shāh Ṭahmāsp), but having proved disloyal to him, left that exalted threshold and went away to some other place. Some malcontents told Amīr Khān, the then ruler of Herāt, that the Mawlānā had satirized him. The Amīr and the people of

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[1] In A.S.B. MS. '*Nasta'līq*'.

Herāt bore some grudge against the Mawlānā on account of the following verse which he had written as a *Shahr Āshūb* :

> Aḥmad Ātūn is sometimes a *Shī'a* and sometimes a *Sunnī*,
> Like the Ghiliwāzī which is a male for six months and a female for (the next) six months.

Amīr Khān summoned him to his court and, when the charge had been proved against him, had his hands and tongue cut. On that occasion he recited the following verse :—

از دست احمد طبسي روز ماجرا دست بريدۀ من و دامانِ مصطفى

After that he began to speak. He also practised writing with his left hand and it is said that he could write a more beautiful hand than before.... The people who had seen the Mawlānā before his tongue was cut state that formerly he used to stammer but, since the incident, he had become quite normal. He survived the ordeal for four years and died at Herāt in A.H. 932.

32. **Mawlānā Faiḍī.** He was the brother of Ḥāfiẓ Bābā Jān and wrote a beautiful hand.

33. **Gulshanī** of Kāshān...... At present he lives at Shūshtar. He writes a good *Nasta'līq* hand.[1]

34. **Ḥayātī.** ... His father had a desire to train him for the post of a Qāḍī but he had no taste for that. He became a calligraphist and a Munshī.

35. **'Abdullāh Shihābī** (or, Shahānī). He is one of the Mamlūks of Qazvīn. He was a talented person and acquired proficiency in various branches, as for instance in calligraphy, *Inshā*, and Poetry.

36. **'Āyatī** of Iṣfahān. He was in charge of a Maktab and wrote beautiful *Nasta'līq*.

37. **Nāzukī** of Tabrīz. He earns his livelihood by sewing caps. He writes very fine *Nasta'līq*.

38. **Mawlānā Ruswā'ī** of Hamadān. He is the brother of Mawlānā Adwār. For a long time he earned his livelihood as a calligraphist but, later, he turned a Qalandar.

39. **Wafā'ī** of Simnān. He is one of the Wazīrzādas of Simnān, but is very careless. He writes *Ta'līq* very well. He is also proficient in Arithmetic.

40. **Kalīmī**[2] of Gīlān. He is always engaged in improving his handwriting. He is good in *Inshā* and is also versed in certain branches of Philosophy.

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[1] In the A.S.B. MS. we read:
'Writes in several styles. Nowadays he is employed as a tutor.'

[2] In the A.S.B. MS.: 'Gulshanī'.

41. Mullā Jān of Kāshān. He was a calligraphist and had invented a new *Khaṭ*, called *Shikasta-basta*. It was like this : two thin leaves, a portion of each of which was black, were placed on each other, and then the writing became visible. He was a wonderful composer too—he could compose one thousand verses in one night !

42. Mawlānā Maḥmūd Ṣabūrī.[1] He works as a calligraphist at Ṭehrān.

43. Mawlānā Wafā'ī of Tūn. He was a scholar, a wit, and a penman.

44. Mawlānā Nigāhī.[2] He was born at Herāt. He works as a calligraphist and takes opium four times a day.

45. Muḥī of Shīrāz. He wrote a beautiful hand. He was also a preacher and an eloquent speaker.

46. Mawlānā ʿAinī. He is one of the calligraphists of Shīrāz. Few can write so swiftly as he does.

47. Riḍā'ī, the dumb. He comes from ʿIrāq. He was very swift as a calligraphist and could transcribe one thousand verses in one day. He was a good judge of poetry. He went away to Asia Minor and, since then, nothing has been heard of him.

48. Mīr Dūst Ṭāramī. He is one of the Khādims of the tomb of Imām Riḍā. He belongs to the Mirzās of Chaghtā and held a high post under the Emperor Bābur.... He earns his livelihood as a calligraphist.... He writes a beautiful hand.

49. Yūsuf Beg Tūshmāl. He belongs to the Ayyūbaghlī tribe—a section of the Chaghtā'īs. Formerly, he was a messenger under the late Ṣāḥib Qirān (i.e. Shāh Ismaʿīl), but, at present, he holds the post of a Tūshmāl under the reigning Ṣāḥib Qirān (i.e. Shāh Ṭahmāsp). He leads a pure and pious life. He has a wonderful capacity for study and can read several scripts, such as *Kūfī*, *Khaṭā'ī*, and *Naṣārī* (Latin). In spite of his onerous duties he does not remain idle for a single moment, and is always engaged in the transcription of books on *Fiqh*, *Ḥadīth*, and *Tafsīr*.

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[1] In the A.S.B. MS. : ' Ṣābirī '.

[2] See another Nigāhī in the list of ' Gilders and Illuminators '.

ARTICLE No. 13.

Collation of the editions of the Sanskrit text of the Nyāyabindu and the Nyāyabinduṭīkā, published in the Bibliotheca Indica and the Bibliotheca Buddhica.

By DURGACHARAN CHATTERJI.

The discovery and publication of the Sanskrit text of the Nyāyabindu together with the Nyāyabinduṭīkā by Professor Peterson some forty years ago have made his name immortal in the history of Indological studies. The Nyāyabindu with the Nyāyabinduṭīkā is one of the very few complete texts of Buddhist logic, which have survived in their original Sanskrit form. In this connection we may note that the Nyāyabindu and its Ṭīkā find place in the list of books presented to a Buddhist community in Burma, as mentioned in a Pagan inscription of 1442 A.D., which "commemorates the bestowal of various gifts on the Order by the Governor of Taungdwin and his wife" (*vide* The Pali Literature of Burma by Dr. Mabel Bode, London, 1909, pp. 101 ff.). Students of Buddhism, particularly in its later phase, can therefore never be too thankful to Prof. Peterson for the discovery and publication for the first time of these texts. Peterson's *editio princeps* has been succeeded by two others, one in 1918 by Prof. Stcherbatsky of Leningrad and another (Kāśī Sanskrit Series) in 1924 by Paṇḍit Chandraśekhara Śāstrī Kāvyasāhityāchārya, Professor, Benares Hindu University. The latter with its Hindi translation and introduction is no doubt welcome as the edition of a Buddhist logical treatise made accessible to readers of an Indian vernacular, but the editor has seemingly not consulted Stcherbatsky's edition and in spite of every attempt on his part to sift the variants given by Peterson, his readings and emendations are not always acceptable. A few instances are noted below.

Peterson's edition	*Kāśī edition*
Page 9, line 1. ०धर्म० In his Note Peterson corrects it to वर्ण० as Stcherbatsky also has it. The Kasi edition does not follow the emendation.	०धर्म० (p. 12, l. 9).
10. 4. प्रौलनम् In the Note it is corrected to मौलनं.	प्रौलनम् (13. 17).

	Peterson's edition	*Kāśī edition*
16. 4.	अनर्थाध्यवसायेन	अनर्थाध्यवसायेन (22. 7).
	Corrected to अर्थाध्यवसायेन as in S.	K only copies P, thus violating the sense, and overlooks the Note of P.
32. 5.	०कैवल्य०	०कैवल्य० (44. 4).
	It should be ०वैकल्यं as in S.	K copies P without considering the sense.
94. 9.	वृत्त्यभावः	वृत्त्यभावः (125. 12).
	It should be निवृत्त्यभावः as in S. (90. 5).	The sense here does not permit वृत्त्यभावः.
118. 8.	दूषणा न्यूनतायुक्तिः	दूषणा न्यूनता युक्तिः
	It should be दूषणानि न्यूनताद्युक्तिः which clearly follows from the *ṭīkā*.	K copies P.

Of Stcherbatsky's edition of the Sanskrit text of the Nyāyabindu with the Nyāyabinduṭīkā (published fourteen years after his edition of the Tibetan translation of the work) we may say that though there are a few misprints, it is a definite improvement upon the edition of Peterson and proves the importance of Tibetan for the student of later Buddhist philosophy and also the necessity of a collation with the Tibetan translation of Buddhist Sanskrit texts whenever such translation is available.

The Asiatic Society of Bengal has now reprinted Peterson's edition. The reasons for doing so have been explained in the foreword to this re-issue. The reprint can, however, be justified on another ground besides those which have been set forth in the preface. Various treatises on Indian logic and philosophy, *e.g.*, *History of Indian Logic* by Vidyābhushana, *Indian Logic and Atomism* and *Buddhist Philosophy* by Keith, *A History of Indian Philosophy* by Dasgupta, and *Indian Philosophy* by Radhakrishnan, refer to the original *Bibliotheca Indica* edition. In his *Central Conception of Buddhism and the Meaning of the Word Dhamma*, Prof. Stcherbatsky has himself referred to the *Bibliotheca Indica* edition long after his own edition was published. Therefore, from the point of view of reference, the importance of the *Bibliotheca Indica* edition of the Nyāyabindu and the Nyāyabinduṭikā is indisputable.

It would, however, be unfair to ignore or to disguise the fact that Peterson's edition contains a number of mistakes which, unless corrected, are likely to perplex students who read it from beginning to end. I have therefore thought it desirable to make a collation of the texts edited by Peterson and Stcherbatsky with due regard to their Tibetan translation as presented in the latter's edition in the *Bibliotheca Buddhica* series.

The following notes may be regarded as an appendix to the re-issue of the *Bibliotheca Indica* edition. I have also attempted to notice all departures from the first edition, some for the better and some for the worse, which have slipped into the reprint, notwithstanding the attempt to make it an exact copy of the first edition. I have discussed only a few variants and it appears that in most cases of difference Stcherbatsky's readings are to be preferred to those of Peterson.

When this paper was in the press, Professor Stcherbatsky's *Buddhist Logic*, Vol. II (*Bibl. Buddhica*, XXVI, 1930) reached me. This volume contains an appendix, No. VI (pp. 433–436), giving corrections to the texts of the Nyāyabindu and its ṭīkā as printed in the *Bibliotheca Buddhica* edition (Vol. VII, 1918). Though some of these corrections had already been noticed by me independently, I have thought it desirable, for the sake of completeness, to insert in my own paper references to all these corrections by Professor Stcherbatsky. These references have been inserted according to their appropriate places in the *Bibliotheca Indica* edition and have all been marked with asterisk.

The numeral references to Stcherbatsky's Sanskrit text after the passage corresponding to page 103 of the *Bibliotheca Indica* edition, are to the numbers of Pariccheda and Sūtra, and not to the page numbers, as before that passage.

The following abbreviations have been used in the present paper.

P_1—Peterson's edition of the Sanskrit text of the Nyāyabindu and the Nyāyabinduṭīkā in the *Bibliotheca Indica* series, 1889.
P—Reprint of the above, 1929.
S—*Bibliotheca Buddhica* edition, Sanskrit text, by Prof. Stcherbatsky, 1918.
T—The Tibetan Translation of the text, as edited by Prof. Stcherbatsky in the *Bibliotheca Buddhica* series, 1904.
A and B—The two manuscripts referred to by Peterson.
N—Critical Note appended to P_1 and P.
C—Corrections to the text of Nyāyabindu and ṭīkā in Appendix VI of *Buddhist Logic*, Vol. II, by Prof. Stcherbatsky.

I am grateful to Mr. Johan van Manen for his suggestion to me to undertake the work and for his advice and encouragement whilst executing this somewhat monotonous task.

COLLATION

P	P_1	S	T
Page 1, line 5 सम्यग्ज्ञानपूर्विका सर्वेत्यादिना	id.	id. (Page 1, line 6)	ཡང་ དག་ པའི་ ཤེས་ པ་ ནི་ཞེས་ བྱ་ བ་ ལ་ སོགས་པས་ (Page 2, line 4) suggests सम्यग्ज्ञानेत्यादिना which is supported by the Nyāyabinduṭikāṭippaṇī, Bib. Bud. (3. 10).
1. 7. स्वाभिधेय०	id.	id. (1. 7)	བརྗོད་པར་བྱ་བ་ (2. 7) supports B which reads अभिधेय०.
2. 10. प्रयोजनमिदम्; read प्रयोजनपदम् as Peterson suggests in N.	id.	प्रयोजनपदम् (2. 8)	དགོས་པའི་ཚིག་གོ་ (3. 14) confirms the emendation of Peterson.
2. 12. ततः	id.	ततश्च (2. 10)	དེ་བས་ན་ (3. 17) agrees with P.
2. 13. संशयव्युत्पादनम्	id.	संशये व्युत्पादनम् (2. 10-11)	
2. 16. प्रकरणमिदम्	id.	id. (2. 12)	རབ་ཏུ་བྱེད་པ་ (4. 2) omits इदम् as in B.

2. 22. ∘प्रेदश्य; misprint for ∘प्रदेश्य. See N which incorrectly refers to l. 23 instead of l. 22.	id.		
3. 4. व्याख्यातॄणाम्	id.	आख्यातॄणाम् (2. 20)	
3. 13. अभिधेयादिषु	id.	उक्तेषु त्वभिधेयादिषु (3. 2)	སྨྲས་ན་ནི་ supports S.
3. 13. तया तु	id.	तया (3. 3)	ངེས་ཀྱང་ (5. 14) agrees with P.
3. 20. पुरुषं	id.	id. (3. 8)	སྐྱེས་བུ་རྣམས་ (6. 6) suggests पुरुषान्.
4. 9. लिङ्गसंबन्धं; read ∘संबद्धं as emended in N.	id.	लिङ्गसंबद्धं (3. 16)	དངོས་པོ་ དང་ དངོས་པོ་མེད་ པ་ མ་ངེས་ པའི་ (7. 16-17) supports S.
4. 18. भावाभावनियतम् should be भावाभावानियतम्. Compare कश्चिदनियतो भावाभावयोः (4. 14).	id.	भावाभावानियतम् (3. 22-23)	
4. 19. अर्थक्रियासमर्थार्थप्राप्ति∘	id.	अर्थक्रियासमर्थप्राप्ति∘ (3. 23).	དོན་བྱེད་པར་ནུས་པ་ཐོབ་ (7. 18) supports S.
5. 3. ∘संसर्गः; N suggests संसर्गैः.	id.	id. (4. 3)	འགལ་ཆོས་ལྡན་པ་ཡིན་ནོ་ (8. 8) supports ∘संसर्गः.

P	P$_1$	S	T
5. 5. कुम्बिका०	id.	कुषिका० (4. 5)	
5. 22. ०निर्भासि … ०प्रवृत्तिः N suggests प्राप्ति in place of प्रवृत्तिः.	id.	०निर्भासात् … ०प्राप्तिः (4. 17)	སྣང་བ་ནི་ ··· ཕྲད་ (9. 16-17) supports S.
6. 2-3. अर्थे ज्ञाते ; N emends it to अर्थिनः.	id.	अर्थिनः (4. 19)	དོན་དུ་གཉེར་བ་རྣམས་ (9. 20–10. 1) supports the emendation.
7. 2. तस्मात् ; misprint for यस्मात्.	यस्मात्		
7. 15. ०द्विविधम् ; corrected to द्वैविध्यम् in N.	id.	द्वैविध्यम् (5. 23)	
8. 8. तुल्य ; read with a hyphen.	id.		
9. 1. ०धर्म० emended to ०वर्ण० in N.	id.	०वर्ण० (7. 2)	ཁ་དོག་ (15. 18) supports S.
9. 13. तु	id.	id. (7. 12)	དོན་དང་ (16. 17) agrees with B which reads च in place of तु.

*9. 14.	विप्रतिपत्तिनिरासार्थम्	id.	id. (7. 12)	དེ་བཞིན་དུ་མ་འཁྲུལ་བ་སྨོས་པས་ཀྱང་རྗེས་སུ་དཔག་པ་བསལ་བ་ཡིན་མོད་ཀྱི། རྟོག་པ་དང་བྲལ་བ་སྨོས་པ་ནི་ལོག་པར་རྟོགས་པ་བསལ་བའི་ཕྱིར་རོ། (16. 20–17. 2) supports B which adds (after विप्रतिपत्तिनिरासार्थं) तथाऽभ्रान्तग्रहणेनाप्यनुमाने निवर्त्तिते कल्पनापोढग्रहणं विप्रतिपत्तिनिरासार्थम् . C also adds the following insertion after विपतिपत्तिनिरासार्थम् in accordance with MSS. and the Tib. translation: *tathābhrāntagrahaṇen-āpy anumānam nirastam syāt, kalpanāpoḍha-grahaṇam tu vipratipatti-nirākaraṇārtham.* But B seems to be in greater agreement with the Tib.

P	P₁	S	T
9. 15. स्वप्रतिभासेऽनर्थेऽध्यवसायेन	id.	स्वप्रतिभासेऽनर्थेऽर्थाध्यवसायेन (7. 13)	རང་གི་སྣང་བ་དོན་མེད་པ་ལ་དོན་དུ་མངོན་པར་ཞེན་པས་ (17. 3-4) supports S. Compare B in N.
10. 4. म्रीलनम्; corrected to मीलनम् in N.	id.	मिलनम् (7. 22)	ཚོགས་ (18. 2) supports मिलनम् or मीलनम्.
10. 5. संसृष्टेऽभिधानाभिधेये; here *Sandhi* is grammatically wrong.	id.	संसृष्टे अभिधानाभिधेये (7. 23)	
11. 6. ०नियमसेतु०; misprint for ०नियमहेतु०.	०नियमहेतु०		
11. 12. श्रोत्रज्ञानं	id.	id. (8. 21)	རྣ་བའི་རྣམ་པར་ཤེས་པ་ (20. 5) may also support the reading श्रोत्रविज्ञानं (B).
11. 18. ०ज्ञानं	id.	id. (9. 2)	རྣམ་པ་ཤེས་པ་ (20. 16) may also support ०विज्ञानं (B).

12. 12. तयोक्ताः ; misprint for तयोक्ताः.	तयोक्ताः	तयोक्ताः (9. 16)	
12. 14-15. ॰लातादावग्नि॰	id.	॰लातेऽग्नि॰ (9. 17)	མགལ་མེ་ · · ན་ (22. 10) supports S.
12. 17. तथाविधं	id.	id. (9. 19)	དེ་ལྟ་བུའི་ཞེས་པ་དེ་ནི་ (22. 15) supports B which reads तत्तथाविधं.
13. 9-10. तदनयोर्न परस्पर-सहकारित्वम्	id.	id. (10. 13-14)	འདི་ ལྟར་ དེ་ གཉིས་ ནི་དེ་ ལ་ གཅི་ ག་ལྷན་ ཅིག་བྱེད་པ་ཉིད་ཡིན་ནོ་ (24. 8) follows B which omits न.
14. 20. तथा ; misprint for यथा.	यथा		
15. 3. स्फुटाभत्वप्रकर्षपर्यन्तः ; read as S.	id.	स्फुटाभत्वं प्रकर्षपर्यन्तः (11. 22)	
15. 3. ज्ञातं	id.	ज्ञातं (11. 23)	བྱུང་ (27. 13) supports S.
*15. 3-4. भाव्यमानस्य	id.	id. (11. 23)	བསྒོམ་པར་བྱ་བའི་དོན་གྱི་ (27. 14) supports C suggesting the addition of अर्थस्य after भाव्यमानस्य.

P	P_1	S	T
15. 11. सप्रति ; misprint for संप्रति.	संप्रति		
15. 13. °स्फुटाभत्वात्सवि°	id.	°स्फुटाभत्वादेव च सवि° (12. 7)	
15. 16. परिसमाप्त्यर्थः	id.	id. (12. 9)	ཡོངས་སུ་རྫོགས་པའི་ཚིག་སྟེ། (28. 14) follows B which reads परिसमाप्तिवचनम् .
15. 21. प्रमाणस्य विषयो	id.	विषयः प्रमाणस्य ; wrongly printed as विषयो प्रमाणस्य (12. 16).	
16. 4. अनर्थाध्यवसायेन ; corrected to अर्थाध्यवसायेन in N.	id.	अर्थाध्यवसायेन (12. 20)	
16. 20. स च	id.	स एव च (13. 13)	
17. 3. भावः। तस्माद्वस्तु° ; read भावस्तस्मात्। वस्तु°.	id.	भावः, तस्मात्। वस्तु° (13. 18)	
18. 6. तस्मादेतद् ; read तस्मात्। एतद् as in S (14. 21).	id.		

*18. 9. अर्थाद्	id.	id. (15. 2)	གཟུང་བར་བྱ་བའི་དོན་ལས་ (33. 18) supports C suggesting the insertion of ग्राह्याद् before अर्थाद्.
*18. 10. भवति। स एव	id.	id. (15. 3)	C drops the *cheda* before स एव.
18. 13. अर्थदर्शन०	id.	id. (15. 5)	དོན་རབ་ཏུ་སྟོན་ (34. 4) supports अर्थप्रदर्शन० (B).
18. 16. सादृश्यम्	id.	id. (15. 8)	མཚུངས་པ་གང་ (34. 10) agrees with B which reads यत्सादृश्यम् .
19. 11. ०संवेदनरूपम् ; put a stop after it as in P_1.			
19. 12. ज्ञानस्य	id.	ज्ञानस्येति (15. 22)	ཞེ་ན་ (35. 18) supports S.
19. 19. ननु	id.	न तु (16. 5)	
20. 3. ०रूपत्वम् ; रूपं (B) is suggested in N.	id.	०रूपत्वं (16. 9)	ངོ་བོ་ཉིད་ (36. 16) supports ०रूपत्वं.
21. 1. व्याख्यातुम्	id.	व्याख्यातुकामः (17. 1)	

	P	P_1	S	T
21. 7.	॰निर्देष्टाङ्गमेव	id.	id. (17. 7)	བསྟན་པའི་ཆེད་ཁོ་ནར་ (39. 3-4) supports A which reads निर्देष्टार्थम् .
*22. 2.	अत्रानुमानेऽपि	id.	id. (18. 9)	དེ་ནི་འདིར་རྗེས་སུ་དཔག་པར་བྱ་བ་ལ་ཡང་ (40. 15) supports C which suggests सात्रानुमानेऽपि. '*sātrāpy* instead of *atrāpy*' is probably a misprint for '*sātrānumāne'pi* instead of *atrānumane'pi*'.
22. 8.	अस्य	id.	id. (18. 13)	Tib. (41. 5) supports B which omits अस्य .
*22. 19.	॰ज्ञानापेक्षम्	id.	id. (19. 2)	ཤེས་པ་བསྐྱེད་པ་ལ་བལྟོས་ནས་ (42. 4-5) supports C suggesting ॰ज्ञानोत्पादापेक्षम्.
22. 20-21.	परोक्षार्थनान्तरीयकतया	id.	परोक्षार्थानान्तरीयकतया (19. 3); the reading seems to be a misprint. P is correct.	ལྐོག་ཏུ་གྱུར་པའི་དོན་མེད་ན་མི་འབྱུང་བར་ (42. 7-8) supports P.

23. 3. पक्षैकदेशासिद्धः	id.	पक्षैकदेशासिद्धः निरस्तो हेतुः (19. 6)	ཕྱོགས་གཅིག་ལ་མ་གྲུབ་པ་བསལ་བ་ཡིན་དེ། (42. 14) suggests पक्षैकदेशासिद्धो निरस्तः .
23. 7. कुर्यात्	id.	id. (19. 9)	སྨྲས་ན་ (43. 1) supports ब्रूयात् (B).
23. 11. साधारणानैकान्तिकः	id.	id. (19. 13)	ཐུན་མོང་གི་མ་ངེས་པ་ཉིད་བསལ་དེ། (43. 8) suggests साधारणानैकान्तिको निरस्तः .
23. 22–24-1. असत्त्ववचनात्	id.	id. (20. 1)	མེད་པའི་སྒྲའི་ (44. 10-11) agrees with B which reads असत्त्वशब्दात् .
24. 2. सर्वत्र	id.	omitted (20. 2)	
25. 1. सशब्दादेशः	id.	सशब्द आदेशः (20. 22)	

26. 9. ॰मुखंव स्तु॰ ; read ॰मुखं वस्तु॰ as in P_1.

28. 11. ॰शास्त्रादि॰ ; misprint ॰शाखादि॰ for ॰शाखादि॰.

	P	P_1	S	T
28. 17.	अचेति एषु	id.	अचेत्यिषु (24. 16); misprint for अचेत्येषु.	
*29. 15.	तस्याप्रतिबद्ध०	id.	id. (25. 15)	འབྲེལ་པའི་ཡུལ་གང་ཡིན་པ་དེ་ལ་ (57. 8) agrees with C suggesting तस्य प्रतिबद्ध०.
*29. 18.	प्रतिबद्धः सः	id.	id. (25. 17); C inserts न before सः.	
29. 18.	अप्रतिबद्धविषयं	id.	अप्रतिबन्धविषयम् (25. 17)	
32. 3.	०प्राप्तार्थः	id.	०प्राप्तोऽर्थः (28. 6)	
32. 5.	०कैवल्य०	id.	०वैकल्य० (28. 7)	བྲལ་བ་ (63. 11) agrees with S. Sense also requires वैकल्य here.
*32. 17.	०संसर्गिणि भासमाने	id.	id. (28. 19)	C in accordance with B adds भूतले before भासमाने. But Tib. འདྲེ་བ་སྣང་བ་ན་ (64. 13) agrees with the original reading.

33. 10-11.	वर्तमाने चामूढस्मृति-संस्कारे	id.	चामूढस्मृतिसंस्कारे वर्तमाने (29. 8)	
33. 18.	घटेऽमूढः		घटे मूढः (29. 14)	
34. 2.	अर्थः	id.	अर्थैः ; misprint for अर्थः (29. 18)	
34. 21.	॰प्रवर्तिन्युपलब्धिः ; this is evidently wrong. Read as in S.	id.	॰प्रवर्तिन्यनुपलब्धिः (30. 9)	མི་དམིགས་ etc. (68. 5) agrees with S.
37. 21.	बिनाशः ; read विनाशः as in P_1.	विनाशः		
40. 2-3.	ज्वलितोरूप॰	id.	ज्वलितरूप॰ (35. 6)	
40. 20.	कार्य्यं corrects P_1.	कार्थं		
41. 19.	गम्येत	id.	गम्यते (36. 19)	
41. 21.	ज्ञायते	id.	ज्ञातम् (36. 20-21)	
42. 9.	विधिनिषेध॰	id.	विधिं निषेधं (37. 9)	

	P	P₁	S	T
*44. 1.	सिध्यति यस्मात्	id.	id. (38. 21); C drops the *cheda* after सिध्यति, but there is none after it in S.	
45. 10.	ज्ञानज्ञेयस्वभावा	id.	न ज्ञानज्ञेयस्वभावा (39. 23)	ཤེས་ པ་ དང་ ཤེས་ བྱའི་ངོ་ བོ་ མ་ ཡིན་ནོ་ (90. 10) confirms S.
46. 3.	तल्लिङ्गम्	id.	id. (41. 4)	རྟགས་ཀྱང་ (92. 10) agrees with A which reads लिङ्गम् in place of तल्लिङ्गम् .
46. 4.	आख्यायते		आख्यायत (41. 4); misprint for आख्यायते.	
46. 4.	अनेनेति त्रिरूपं लिङ्गम्	id.	अनेन त्रिरूपलिङ्गम् (41. 4-5)	འདིས་ཚུལ་གསུམ་པའི་རྟགས་ (92. 10-11) supports S.
46. 6.	परस्मायिदं	id.	परस्मायिति (41. 5-6)	གཞན་གྱི་ཆེད་ཡིན་པས་ (93. 2) supports S.

47. 4. तदिति	id.	तादति (42. 7); misprint for तदिति.	
47. 13. यथाद्यघटः	id.	यथा घटः (42. 17-18)	དཔེར་ན་བུམ་པ་ལྟ་བུའོ་ (95. 10) supports S.
47. 13. यथा च	id.	तथा च (42. 18)	དེ་བཞིན་དུ་ (95. 11) supports S.
48. 11. भुंक्ते इति ; read भुंक्त इति as in P_1.	भुंक्त इति		
50. 3. उत्पत्तिमत्	id.	id. (45. 5)	གང་ སྐྱེ་ བ་ དང་ ལྡན་ པ་ ཞེས་ བྱ་ བས་ ནི་ (101. 1-2) supports A which repeats the *pratika* यदुत्पत्तिमदिति after उत्पत्तिमत्.
50. 4. ॰विधेः	id.	॰विधिः (45. 6)	བསྒྲུབ་པའོ་ (101. 3) supports S.
*51. 3-4. व्यतिरिक्तं विशेषणपदम्	id.	id. (46. 4-5); C suggests व्यतिरिक्तविशेषणपदम्.	
51. 4-5. विशेषणम्	id.	विशेषणपदम् (46. 5)	བྱེ་བྲག་གི་ཚིག་ (103. 3) supports S.

P	P_1	S	T
51. 19. शुव्यो ; misprint for शुद्धो	शुद्धो		
52. 11. नानन्तरीयकतया	id.	नान्तरीयकतया (47. 9)	
*52. 16. कृतकत्वम्	id.	कतकत्वम् (47. 13); obvious misprint for कृतकत्वम्. cf. C.	
53. 6. स्वभाव इह	id.	स्वभाव एव इह (48. 2)	
53. 13. अथो ; misprint for अर्थो	id.		
53. 15. Separate °यतिव्या° as in P_1.			
54. 10. स्वभावः। स एव च साध्यः	id.	यः स्वभावः स एव च साध्यः (49. 3-4)	རང་བཞིན་ཡིན་ལ། དེ་ཡང་བསྒྲུབ་པར་བྱ་བ་ཡིན་ནོ་ (110. 3) supports P.
54. 14. अनुगन्तव्यः	id.	अवगन्तव्यः (49. 9)	ཆུད་པར་བྱའོ་ (110. 13-14) supports S.

54. 15.	तथा ; read यथा as in P_1.	यथा	id. (49. 10)	
54. 19-20.	कार्यकारणत्वनिश्चयो ह्यवश्यकर्त्तव्यः	id.	कार्यकारणभावनिश्चयो ह्यवश्यं कर्त्तव्यः (49. 15)	
*55. 3.	असत्त्वनिवृत्तिश्च । सत्त्वम्	id.	id. (50. 6) ; C drops the *cheda* before सत्त्वम्.	
55. 6.	हेतुरपि	id.	हेतुरपि न भवेत् (50. 8)	གཏན་ཚིགས་ཀྱང་ཡོད་པར་མི་འགྱུར་ཏེ་ (112. 14) supports S.
55. 12.	०नित्यस्य	०नित्वस्य ; misprint corrected in P.	०नित्यत्वस्य (50. 15)	མི་རྟག་པ་ཉིད་ (113. 10) supports S.
*55. 13.	उक्तः । त्रिष्वपि	id.	id. (50. 16) ; C drops the *cheda* after उक्तः.	
56. 10.	ते	id.	omitted (51. 16)	
56. 19.	सर्वस्य	id.	सर्वस्य प्रतिबद्धस्य (52. 5)	འབྲེལ་པ་ཐམས་ཅད་ཀྱི་ (117. 5) supports S.

	P	P_1	S	T
57. 9-10.	°निवर्तकप्रतिबन्धो	id.	°निवर्तकयोः प्रतिबन्धो (52.19)	
57. 20.	निवृत्तिदृश्यसत्त्वरूपम्	id.	निवृत्तिं दृश्यसत्त्वरूपाम् (53. 9)	
58. 3.	°नुपलभ्यमानतादृश्यम्	id.	नुपलभ्यमानं तादृश्यम् (53. 12-13)	
58. 7.	दृष्ट्वा	id.	दृष्टात् (53. 17)	
*58. 7-8.	एवमेवार्थम्	id.	id. (53. 18)	དོན་འདི་ཉིད་ (121. 3) supports C which corrects the reading to एतमेवार्थम्.
58. 9.	नेह	id.	नेह प्रदेशे (53. 22)	ཕྱོགས་འདི་ན་ (121. 10-11) supports S.
58. 10.	°प्राप्तमिति । अनुपलम्भानुवादः	id.	°प्राप्तं सन्नोपलभ्यत इत्यनुपलम्भानुवादः (53. 23)	གྱུར་བ་གང་ཡང་མི་དམིགས་པ་ཞེས་བྱ་བ་ནི་མི་དམིགས་པ་རྗེས་སུ་བརྗོད་པའོ་ (121. 12-13) supports S.

58. 12.	०लभ्यत इत्यादिना	id.	०लभ्यते चेत्यादिना (54. 2)	འདི་ན་ཡང་དམིགས་པའི་མཚན་ཉིད་དུ་གྱུར་པ་ཞེས་བྱ་བ་ལ་སོགས་པས་ (121. 16–122. 1) suggests a slightly different reading: नोपलभ्यते चाचोपलब्धिलक्षणप्राप्त इत्यादिना .
58. 18.	उपलभ्यते	id.	स उपलभ्यते (54. 10)	དམིགས་པ་ (122. 17) supports P.
59. 2.	सामर्थ्यात्ततः	id.	सामर्थ्यम् । अतः (54. 14)	ཤུགས་ཡིན་ནོ། དེ་བས་ན་ (123. 9) supports both P and S.
60. 7.	प्रत्यासन्नभूतः	id.	प्रत्यासन्नः । ततः (56. 4)	ཉེ་བ་ ··· དེའི་ཕྱིར་ (126. 17-18) supports S.
60. 8.	ननु	id.	न तु (56. 5)	
60. 11.	यद्येव	id.	यद्येवम् (56. 9)	གལ་ཏེ་དེ་ལྟར་ན་ (127. 7) supports S.
60. 18.	तत्सिद्धः	id.	तस्मिन्सिद्धः (56. 18)	དེ་ལ་གྲུབ་པའི་ (128. 8) supports S.

	P	P₁	S	T
*60. 22.	आहोपुरुषिकया		ओहापुरुषिकया (56. 21); misprint for आहोपुरुषिकया. cf.C.	
61. 2.	एव	id.	एव तस्य (56. 22)	དེ་ཉིད་ (128. 18) supports P.
61. 10.	सामर्थ्योक्ततत्त्वात्	id.	सामर्थ्योक्तत्वात् (57. 7-8)	ཤུགས་ཀྱིས་སྨྲས་པའི་ཕྱིར་ (129. 12) confirms S.
61. 11.	सोऽधि०	id.	सोऽर्थोऽधि० (57. 10)	དོན་དེ་འོ་ (129. 16) supports S.
61. 22.	तद्वदत्र यत्प्रमाणे	id.	तद्वदत्र प्रमाणे (58. 1)	དེ་བཞིན་དུ་ཚད་མ་འདིར་ (131. 6) supports S.
62. 7.	परार्थमात्रेण	id.	पारार्थ्यमात्रेण (58. 6)	
62. 12.	वादिनः	id.	वादिना (58. 9)	
62. 16.	प्रदर्शनाय	id.	प्रतिपादनाय (58. 14)	
62. 18.	चैतैः	id.	च तैः (58. 16)	

63. 3.	**यथा**	omits **यथा**	id. (59. 2)	རྗེས་སུ་ etc. (133. 16) supports S and P_1.
63. 10.	**तत्सांकेतिकेन**	id.	**यच्छब्दाकारसंसर्गयोग्यं तत्सांकेतिकेन** (59. 9)	སྒྲའི་ རྣམ་ པ་ དང་ འདྲེར་ རུང་ བ་ གང་ ཡིན་ པ་དེ་ཡང་བརྡ་ལས་བྱུང་བའི་སྒྲས་ (134. 12-13) agrees with S.
63. 12.	**द्रष्टव्यम्**	id.	omits **द्रष्टव्यम्** (59. 10)	གནོད་པར་ etc. (134. 16) agrees with S.
64. 10.	**असन्ग्राह्यः**	id.	**असन्नर्थो ग्राह्यः** (60. 6)	གཟུང་བར་བྱ་བ་མེད་པར་ (136. 12) supports P.
64. 12.	**सन्नर्थो**	id.	**सन्नार्थो** (60. 8); misprint for **सन्नर्थो**.	དོན་ཡོད་པར་ (136. 10) supports P.
65. 4.	**॰वस्तुविना॰**	id.	**॰वस्त्वविना॰** (60. 18)	ཕྱིའི་ དངོས་ པོ་མེད་ ན་ མི་ འབྱུང་ པ་ ཉིད་ (137. 13) supports P.
65. 4.	**पूर्वकम्**	id.	**पूर्वम्** (60. 19)	
65. 6.	**एवं**	id.	**एवं च** (60. 21)	དེ་ལྟ་ཡིན་དང་ (137. 17) supports S.

	P	P₁	S	T
65. 22.	परिसमापय्य	id.	परिसमाप्य (61. 14)	
66. 4.	बोध्यते	id.	चोच्यते (61. 19)	ཡང་བརྗོད་ན་ནི་ (140. 5) supports S.
66. 22.	॰स्व	id.	॰स्वेति द्वन्द्वः। तत्र विज्ञानं चक्षुरादि-विज्ञानम्। (63. 1)	ཚོ་ཞེས་ ཟླས་དབྱེ་བའོ་ དེ་ལ་ རྣམ་པར་ཤེས་པ་ནི་མིག་ ལ་སོགས་ པས་ བསྐྱེད་པའོ ། (142. 15) supports S.
67. 1.	॰स्थितरूपम्	id.	॰स्थितं रूपम् (63. 2)	
67. 10, 11.	॰सत्तया	सत्त्वाया ; obvious misprint.		
67. 11.	यन्मरणहेतुः	id.	यन्मरणं हेतुः (63. 9)	
67. 21.	स्वं रूपम्	id.	स्वरूपम् (63. 19)	
69. 5.	॰पातविभ्रमः	id.	॰पातनिकुञ्जे विभ्रमः (65. 4)	གྲག་པའི་རི་སུལ་ལ་རྨོངས་པ་ (147. 11) supports S which follows B.

69. 6.	**अस्मात्**	id.	**अन्यस्मात्** (65. 5)	གཞན་ན་ (147. 10-11) supports S which is undoubtedly a better reading.
69. 17.	धर्मिबद्धस्य	id.	धर्मिसंबद्धस्य (65. 16)	
*69. 18.	तथा परस्य	id.	id. (65. 18); C reads it as तथापरस्य.	
*70. 1 (bis)	अनित्यत्व॰	id.	id. (66. 3, *bis*)	རྟག་པ་ (149. 13) agrees with C substituting नित्यत्व॰ for अनित्यत्व॰.
*70. 4.	अनित्य॰	id.	id. (66. 6)	རྟོག་པ་ (149. 18) agrees with C reading नित्य॰ in place of अनित्य॰.
*70. 6.	अनित्यः	id.	id. (66. 7)	རྟག་སྟེ་ (150. 3) agrees with C correcting अनित्यः to नित्यः.
70. 11.	विपक्षैकदेशशब्दवृत्ति	id.	विपक्षैकदेशवृत्ति (66. 10-11)	མི་མཐུན་པའི་ཕྱོགས་ཀྱི་ཕྱོགས་གཅིག་ལ་ཡོད་པ་ཡིན་ནོ་ (150. 14-15) agrees with S.

	P	P₁	S	T
70. 22.	रागः	id.	रागाः (66. 22)	
*71. 9.	सन्देह०	id.	सदेह० (67. 10); misprint for सन्देह०. cf. C.	
71. 13.	असद्रूपमपि	असद्रमोऽपि; obvious misprint.	असद्रूमोऽपि (67. 15)	མེད་དེ་ཞེས་ནི་···སྨྲའི། དོན་ཀྱང་ (153. 14-15) supports S.
71. 14.	एतन्न	id.	omitted (67. 16)	ཐམས་ཅད་མཁྱེན་ etc. (154. 4) supports S.
*72. 16.	०स्थानयोग्यो	id.	id. (68. 14)	གནས་སྐབས་སུ་རུང་བར་ (156. 8) does not support C which suggests ०स्थानाधानयोग्यो in place of ०स्थानयोग्यो.
72. 21.	तादृशो	id.	तद्देशो (68. 18)	
73. 1.	अन्धकारे देशे	id.	अन्धकारदेशे (68. 19-20)	
73. 22.	कश्चिदिष्टो	id.	कश्चिद्दृष्टो (69. 13)	
74. 4.	परस्परं परिहारः	परस्परपरिहारः	id. (69. 21)	

74. 12.	नीलमभावम्	id.	नीलं स्वाभावं (70. 4)	སྔོན་པོ་ཉི་དངོས་པོ་མེད་པ་ (159. 13) supports P.
*74. 15.	अर्थस्तस्य	id.	अर्थो (70. 7); wrongly printed as अथो cf. C.	དོན་ཡིན་གྱི་ (159. 18) agrees with S.
74. 17.	यतः	id.	अतः (70. 8)	དེ་བས་ན (160. 2) can support both P and S.
74. 19.	न । नियताकारः	id.	अनियताकारः (70. 9)	རྣམ་པ་མ་ངེས་པ་ (160. 4) supports S.
*74. 21.	एवं नित्यत्वे पिशाचा०	id.	एवं नित्यत्वपिशाचा० (70. 11); C adds च after एवम्.	དེ་ལྟར་ན་རྟག་པ་དང་འདྲེ་ལ་སོགས་པ་ (160. 7-8) confirms S.
75. 13.	भिन्नप्रवृत्तिविषयौ	id.	भिन्नविषयौ (70. 21)	ཡུལ་ཡང་ཐ་དད་པ་ (161. 8) supports S.
*75. 18.	अदृष्टस्य	id.	id. (71. 3)	མི་སྣང་བ་ (161. 18) supports C suggesting अदृश्यस्य for अदृष्टस्य.

P	P_1	S	T
75. 22. ०विधानेन ; read ०विधाने न as S.	id.	विधाने न (71. 7)	
*76. 7. वक्तृत्वविरोधिविरुद्ध-विधिः	id.	वक्तृत्वविधेर्विरुद्धविधिः (71. 13-14) ; wrongly printed as ०र्विधिः. cf. C.	སྨྲ་བ་ཉིད་སྒྲུབ་པས་ནི་འགལ་བ་སྒྲུབ་པ་ (163. 1) supports S.
*76. 15. वा कारणस्य	id.	id. (72. 2)	རྒྱུ་མ་ཡིན་པ་ (164. 1) supports C suggesting वाकारणस्य in place of the original reading.
76. 16. ०स्वेति	id.	०स्व (72. 3)	
*76. 20. ०रूपादि०	id.	id. (72. 7)	ཚུལ་ (164. 13) supports C suggesting ०रूप० in place of ०रूपादि०.
76. 21. द्वयोः	id.	द्वयोरिति । द्वयोः (72. 10)	ཚུལ་གཉིས་ཞེས་བྱ་བ་སྨོས་ཏེ་ (164. 18) suggests an original like द्वयो रूपयोरित्याह .
77. 3. संवन्धः ; read संबन्धः as in P_1.	संबन्धः		

77. 12.	साधयतः	id.	साधयतः । ततः (73. 6)	དེ་པས་ན་ (166. 17) supports S.
78. 19.	साधयतु वा	id.	साधयतु (74. 18)	
78. 21.	साध्ये	id.	साध्यम् (74. 19)	བསྒྲུབ་པར་བྱ་བ་ (170. 10-11) supports S.
79. 1.	विशेषे	id.	विशेषो (74. 21)	
79. 5.	ननू०	id.	न तू० (75. 1)	
79. 6.	असिद्धौ विरुद्धः	id.	अविपर्य्ययसिद्धौ विरुद्धः (75. 4); obvious misprint for विपर्ययसिद्धौ विरुद्धः.	མ་གྲུབ་ན་འགལ་བ་ (171. 6) supports P.
79. 16-17.	सद्धात्मना		यथेति सद्धात्मना (76. 2)	
80. 2, 8.	यकाभ्याम्	id.	याभ्याम् (76. 7, 11)	
*80. 4.	अवियुक्तम्	id.	id. (76. 8)	མ་བྲལ་ (174. 2) agrees with the original reading of S which has been corrected to वियुक्तम् in C.

	P	P_1	S	T
80. 7.	हेतुविरुद्धः	id.	हेतुर्विरुद्धः (76. 11)	
80. 20.	तदन्यत्	id.	अन्यत् (77. 3)	གཞན་ནི་ (175. 13) supports S.
82. 3.	इत्याह	id.	इत्याशंक्याह (78. 15)	སྙམ་དུ་དོགས་པ་ལ་ (178. 11) supports S.
82. 7.	सोऽपरस्य	id.	स एवापरस्य (78. 21)	
82. 7.	भावे	id.	भाव॰ (78. 21)	ཡོད་པར་ (179. 6) seems to support S.
82. 8.	भवति। निश्चयस्याव्यभिचारी	id.	भावनिश्चयस्याव्यभिचारी (79. 1)	ཡོད་པར་ངེས་པ་མི་འཁྲུལ་བ་ཡིན་ནོ་ (179. 7) agrees with S.
83. 10, 11.	॰नैकान्तिकः	id.	॰नैकान्तिक इत्याह (79. 21, 22)	
83. 14.	॰भ्यां च परः	id.	॰भ्यामपरः (80. 4)	རྣམ་པ་གཞན་ (181. 19) supports S.
83. 18.	यदसि॰	id.	यदासि॰ (80. 9)	གང་གི་ཚེ་ (182. 10) supports S.
84. 7.	अनुमानसद्भावः	id.	अनुमानस्य संभवः (80. 21)	

84. 8.	अनुमानसद्भावः	id.	अनुमानसंभवः (80. 22)	
84. 9.	प्रमाणसिद्धौ	id.	प्रमाणसिद्धे (81. 1)	
84. 12.	असंभवो नोक्तः	id.	असंभवान्नोक्तः (81. 3)	མི་སྲིད་པ་དེའི་ཕྱིར་མ་སྨོས་སོ་ (184. 1-2) supports S.
84. 18.	च स्वभावाव्यभिचारित्वान्न	id.	वस्त्वभावाव्यभिचारित्वान्न (81. 11)	དངོས་པོ་མེད་པར་མི་འཁྲུལ་བ་ཡིན་པའི་ ཕྱིར་འགལ་བ་ཉིད་མི་སྲིད་དོ་ (184. 14–16) agrees with S.
84. 18.	स्यात्	id.	स्यादेतत् (81. 12)	
85. 7.	°मानेनागम°	id.	°मानमागम° (82. 1)	
85. 14.	सन्तमसन्तं	id.	तं तमसन्तम् (82. 9)	མེད་པའི་ ··· དེ་དང་དེ་ (186. 14) confirms S.
86. 11.	प्रयोजयितुम्	id.	योजयन् (83. 8)	
86. 16.	°स्वभावं	id.	°स्वभावः (83. 14)	
86. 21.	संबन्धित्वात्	id.	तत्संबन्धित्वात् (83. 17.)	

P	P₁	S	T
87. 12. तत्तत्	id.	न तत् (84. 9)	དེ་ཉི་དེ་ན་མེད་དེ་ (191.9) agrees with S.
87. 12. व्याप्यदृश्या॰	id.	व्याप्यस्य दृश्या॰ (84. 9)	
87. 15. व्यक्तेरन्तरालं	id.	व्यक्त्यन्तरालं (84. 11)	
87. 17. चोपलभ्यते ; an obvious mistake.	id.	नोपलभ्यते (84. 12-13)	
88. 13. गमकस्तद्वचनम्	id.	गमकः । ततस्तद्वचनम् (85. 4)	
88. 21. तत्तथा	id.	तथा (85. 10)	
89. 2. गतार्थत्वम्	id.	गतार्थम् (85. 13)	དོན་གོ་བ་ཡིན་ (194. 14) agrees with S.
*89. 5. पुनस्तत्	id.	id. (85. 23) ; C inserts a *cheda* after it.	
89. 17. इत्याह । ... ॰लक्षणो	id.	तदित्याह । ... ॰लक्षणां (86. 9)	
90. 1. ॰अत्र	id.	॰अत्रेति (86. 13)	གཞན་པ་ལྟ་བུའོ་ (197. 11) supports S.

90-19. °प्रतिपत्त्यर्थम्	id.	°प्रतिपत्त्यर्थः (87. 1-2)	
91. 1. °साधनस्य		°साधकस्य (87. 4)	
91. 4. °प्रदर्शिनः; misprint for °प्रदर्शनः.	id.	°प्रदर्शनः (87. 7)	
91. 6. इत्याह	id.	कस्मादित्याह (87. 8)	འདི་ག་ལས་ཞེ་ན། བཤད་པ་ (199. 10-11) supports S.
91. 20. असर्वगतं द्रव्यपरिमाणं	id.	असर्वगतद्रव्यपरिमाणं (88. 1)	
91. 22. घटस्येति	id.	घटस्य (88. 3)	
91. 22. तथा	id.	तथेति (88. 7)	དེ་བཞིན་དུ་ (201. 15) supports P.
92. 15-16. ततो वक्तृत्वस्य रागादिमत्त्वं विहितम्	id.	omitted (88. 19)	Tib. (203. 11) agrees with S.
93. 15. °नित्यत्वे।	id.	°नित्यत्वे। ततः कृतकत्वमनित्यत्वे नियतमेव। (89. 13-14)	དེ་བས་ན་བྱས་པ་ཉིད་མི་རྟག་པ་ཉིད་ལ་ངེས་པ་ཁོ་ན་ཡིན་ནོ་ (205. 6-7) supports S.

	P	P$_1$	S	T
94. 4.	वैधर्म्येण	द्वैधर्मेण ; misprint corrected in P.		
94. 9.	वृत्त्यभावः	id.	निवृत्त्यभावः (90. 5)	ལྡོག་པ་མ་ཡིན་པ་སྟེ་ (206. 18) supports S.
*94. 16.	इत्यादिहेतुः	id.	id. (90. 16); C suggests इत्यादि हेतुः.	
96. 9.	निवृत्तिः	id.	व्यावृत्तिः (92. 7)	
96. 18.	०पलखण्डेति ; obviously wrong.	id.	०पलखण्ड इति (92. 17)	
97. 16.	०सादृश्यभावेन	id.	०सादृश्यमात्रेण (93. 10)	མི་འདྲ་བ་ཙམ་གྱི་སྒོ་ནས་ (216. 4-5) supports P.
98. 9.	साध्यनियतं हेतुं	id.	साध्यनियतहेतुं (94. 1)	
98. 12.	हेतुप्रदर्शनाय	id.	हेतुप्रदर्शनाय हि; (94. 7); wrongly printed as हेतप्रु०.	
98. 18.	०नेति न	id.	०नेति (94. 11)	Tib. (218. 14) agrees with S.

98. 19-20.	स्वकार्यकरणात् ;	id.	स्वकार्याकरणात् (94. 13)	རང་གི་བྱ་བ་མི་བྱེད་པའི་ཕྱིར་རོ་ (218. 16) agrees with S.
98. 21.	दूषणा का द्रष्टव्या	id.	दूषणानि कानि द्रष्टव्यानि (94. 16)	
98. 22.	०ह्युच्यते । न ये० ; as printed the text is meaningless.	id.	उच्यतेऽनये० (94. 16)	
99. 2.	उद्भावनं	id.	उद्भावकं (94. 20)	བརྗོད་པའི་ཚིག་གང་ (219. 15) seems to support S.
99. 5-6.	निश्चयनिबन्धात्	id.	निश्चयप्रतिबन्धात्	ངེས་པ་ལ་གེགས་བྱེད་པའི་ཕྱིར་ (220. 4-5) supports S.
*99. 6.	०भावो	id.	०भावौ (95. 2); misprint for ०भावो. cf. C.	
99. 7.	उक्ता दूषणाभासाः	id.	उक्तं दूषणम् ।...दूषणाभासा इति (95. 3, 5)	སུན་འབྱིན་པར་སྨྲས་ཟིན་ཏོ ||···སུན་འབྱིན་པ་ལྟར་སྣང་བ་ནི། (210. 6-7, 10) supports S.

P	P_1	S	T
103. 6–9. इन्द्रियज्ञानस्वविषयानन्तरविषयसहकारिणेन्द्रियज्ञानेन समनन्तरप्रत्ययेन जनितं तत्। मनोविज्ञानं सर्वं चित्तचैत्तानामात्मसंवेदनं भूतार्थभावनाप्रकर्षपर्यन्तजं योगिज्ञानं चेति; to be read with proper punctuations as in S.	id.	इन्द्रियज्ञानं। (Chap. I, Sūtra, 8) स्वविषयानन्तरविषय...तन्मनोविज्ञानम्। (I. 9) सर्वं चित्तचैत्तानामात्मसंवेदनम्। (I. 10) भूतार्थ...योगिज्ञानं चेति। (I. 11)	
*103. 12. ०लक्षणत्वाद्वस्तुनः	id.	id. (I. 15)	ཏོ་ན (31. 5) supports C adding एव before वस्तुनः.
104. 8-9. तदभावश्चेति त्रिरूपाणि च। त्रीण्येव च लिङ्गानि; to be read with proper punctuations as in S.	id.	तदभावश्च। (II. 10) त्रिरूपाणि च त्रीण्येव लिङ्गानि (II. 11)	
104. 9. स्वभावकार्ये	id.	स्वभावकार्यं (II. 12)	
104. 12. यः स्वभावः	id.	omitted (II. 15)	
104. 13. यत्प्रत्यक्षः	id.	यः प्रत्यक्षः (II. 15)	

*104. 14.	स्वसत्तामात्रभाविनि	id.	स्वसत्ताभाविनि (II. 16)	རང་བཞིན་ནི་རང་ཡོད་པ་ཙམ་དུ་གྱུར་པ་ (53. 1) agrees with P. cf. C.
105. 6.	°सिद्धिरपि	id.	°सिद्धिः (II. 26)	
105. 13.	उपलब्धिक्षणा°; obvious misprint for उपलब्धिलक्षणा°.	उपलब्धिलक्षणा°	id. (II. 32);	
105. 18.	इति	id.	omitted (II. 34)	
106. 4.	इति	id.	omitted (II. 37)	
106. 10.	इति	id.	omitted (II. 40)	
106. 19-20.	अभावव्यवहार°	id. (106. 19)	अभावाभावव्यवहार° (II. 46.)	མེད་པའི་ཐ་སྙད་ (85. 14) supports P.
*107. 4.	°भावासिद्धिः	id.	°भावसिद्धिः (II. 47); C suggests °भावाभावसिद्धेः.	ཡོད་པ་དང་། མེད་པ་མི་འགྲུབ་པའི་ཕྱིར་རོ་ (87. 16) agrees with the emended reading of C.
107. 5.	°मानानिवृत्ति°	id.	°माननिवृत्ति° (II. 48)	
108. 16.	तत्स्वभावत्वात्	id.	तस्यैव तत्स्वभावत्वात् (III. 18)	

	P	P_1	S	T
109. 1.	धूम०	id.	यत्र धूम० (III. 23)	
*109. 4.	वैधर्म्यवतः	id.	वैधर्मवतः (III. 25); misprint for वैधर्म्यवतः. cf. C.	
109. 8.	असंस्व	id.	संस्व (III. 26)	
109. 10.	चास्तीति	id.	चास्ति धूम इति (III. 27)	
109. 11.	साध्ये न; read as साध्येन.	id.	साध्येन (III. 29)	
109. 13.	साध्यभावे	id.	साध्याभावे (III. 31)	བསྒྲུབ་པར་བྱ་བ་མེད་ན་ (116. 1) agrees with S.
109. 18.	सदेवान्वय०; misprint for तदेवान्वय०.	तदेवान्वय०	id. (III. 34)	
110. 1.	०वश्यवाक्य०	id.	०वश्यं वाक्य० (III. 34)	
110. 4.	प्रयोगेऽवश्यं	id.	प्रयोगे नावश्यं (III. 36)	
110. 13.	इष्टो निराकृतः	id.	इष्टोऽनिराकृतः (III. 40)	

110. 16.	साध्यत्वेनैवेष्टं	id.	साध्यत्वेनेष्टं (III. 43)	
*110. 18.	एतेन	id.	एतने (III. 46); misprint for एतेन. cf. C.	
110. 18.	स्थितसाधनम्	id.	स्थितः साधनम् (III. 46)	
111. 5.	०र्थताऽनेनोक्त०	id.	०र्थता साध्या। अनेन नोक्त० (III. 49)	
111. 13.	सिद्धस्य	id.	एवं सिद्धस्य (III. 56)	དེ་ལྟར་ན་གྲུབ་བ་ (138. 4) agrees with S.
111. 16.	इष्टो निराकृतः	id.	इष्टोऽनिराकृतः (III. 56); wrongly printed as ०कृत.	
111. 17.	पक्षलक्षणमवद्यं	id.	पक्षलक्षणमनवद्यं (III. 56)	
112. 12.	०लभ०	id.	०लभ्य० (III. 67)	
112. 13.	असपक्षे सत्त्वस्य	id.	असपक्षेऽसत्त्वस्य (III. 68)	མཐུན་པའི་ཕྱོགས་ལ་མེད་པའི་ (148. 18) supports S.

P	P₁	S	T
*112. 14. अनित्यत्व०	id.	id. (III. 69)	རྟག་པ་ཉིད་ (149. 8) agrees with the emendation of C suggesting नित्यत्व in place of अनित्यत्व. See Nyayapraveśa (G.O.S. vol XXXVIII), p. 3, l. 19.
113. 6. ऽन्यभावः । अभावाद्	id.	ऽन्यभावेऽभावाद् (III. 75)	
113. 7. भाववत्	id.	भावाभाववत् (III. 77)	
*113. 10-11. वा कारणस्य	id.	id. (III. 81)	རྒྱུ་མ་ཡིན་པ་ (163. 17) supports C suggesting वाकारणस्य.
113. 13. सत्त्वस्य सपक्षे	id.	सत्त्वस्यासपक्षे (III. 86)	
113. 17. तत्र	id.	ननु (III. 89)	
*114. 12....प्राणादेरसिद्धिः। तस्माज्जीवच्छरीरसम्बन्धी प्राणादिः सात्मकादनात्मकाच्च सर्वस्माद्व्यावृत्तत्वेनासिद्धेः। ताभ्यां न व्यतिरिच्यते; it appears to be the proper reading.	id.	...प्राणादेरसिद्धिस्ताभ्यां न व्यतिरिच्यते। (III. 103) तस्माज्जीवच्छरीरसम्बन्धी प्राणादिः सात्मकादनात्मकाच्च सर्वस्माद्व्यावृत्तत्वेनासिद्धः। (III. 104)	སྲོག་ལ་སོགས་པ་མ་གྲུབ་པའི་ཕྱིར་ (III. 103) དེ་བས་ན་, etc. (III. 104) supports P which is also borne out by the commentary. C too accepts P.

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*114. 16-17.	॰पराभावनान्तरीयकत्वात्	id.	॰परभावनान्तरीयकवत्त्वात्; (III. 108); ॰वत्त्वात् is a misprint for ॰कत्वात्, corrected in C.
*115. 8.	स्वभावोपसंहारसंभवात्	id.	id. (III. 217); C corrects it to स्वभावस्योपसंहारसंभवात्.
115. 9.	॰कार्येषूपलम्भेषु	id.	॰कार्यानुपलम्भेषु (III. 118)
115. 9.	तत्र	id.	अत्र (III. 119)
116. 2-3.	व्यावृत्तरूपम्	id.	व्यावृत्ती रूपम् (III. 123)
*117. 2-3.	यथा सर्वज्ञाः	id.	यथा सर्वज्ञाः (III. 131); read यथासर्वज्ञाः; The emendation in C should be *yathāsarvajñāḥ* and not *yathāsarvajñaḥ* as printed. cf. Buddhist Logic, Vol. II, p. 243, f.n. 2.

सन्दर्भ ग्रन्थ
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P	P$_1$	S	T
117. 7. असर्वज्ञाता० ; misprint for असर्वज्ञता.	असर्वज्ञता०		
117. 13. व्यावृत्तिः । संदिग्धा ; read as S.	id.	व्यावृत्तिः संदिग्धा (III. 132)	
*117. 20. स वक्ता	id.	id. (III. 134) ; this is emended in C to स न वक्ता but it is inaccurate. cp. Buddhist Logic, Vol. II, p. 247, f.n. 2, which gives an admissible reading. But it is to be noted that the printed text is not wrong ; for यत्रावीतरागत्वं नास्ति न स वक्ता is identical in sense with यत्र वीतरागत्वं नास्ति स वक्ता (स न वक्ता अस्ति भवतीत्यर्थः).	

118. 1. व्यावृत्तया ; as printed, it is meaningless.	id.	व्यावृत्तं यो (III. 134) ; यो is a misprint for यः.
118. 3. वैधर्म्येणापि	id.	omitted (III. 136)
118. 8. दूषणा न्यूनता युक्तिः	id.	दूषणानि न्यूनताद्युक्तिः (III. 138)
118. 10. अनुभूत०	id.	अभूत० (III. 141)
124. 10. l. 22; it should be l. 21 owing to the rearrangement of types.		
124. 26. p. 18 is a misprint for p. 28.		
127. 10. दग्राग्रह ; read with a hyphen after it.		
127. 19-20. l. 22, l. 23 ; read l. 21 and l. 22 respectively.		
128. 2. च व्याख्येयं ; read as in P_1.	च व्याख्येयं	
130. 22. चायस्व ; read as in P_1.	चायुस्व	

P	P_1	S	T
131. 9. विद्युदाकाशघटवत् corrects P_1.	विद्युदाकाश-ड्वटवत्		
131. 22. ष्पंधकार॰ ; read as in P_1.	अंधकार॰		
132. 20. तत्क्रोडी॰ ; read as in P_1.	तत्क्रोडी॰		
133. 23. वक्तुदोषात् ; misprint for वक्तुर्दोषात्	id.		

ARTICLE NO. 14.

The Endoskeleton of *Labeo rohita* (Ham. Buch.).

By DAYA SHANKAR SARBAHI.

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INTRODUCTION.

The Rohu, *Labeo rohita* (Ham. Buch.), is studied as a type of Bony Fishes in almost all the Universities of India, but as there is no adequate and suitable description available of this fish, I am working out its anatomy with a view to publish a memoir on this type. In this paper, I am giving a reasonably complete account of the endoskeleton of Rohu and hope to publish an account of the soft parts before long. I hope that this work will prove useful to students working on this type and that it will stimulate further work.

The work was carried out during my tenure of the Research Fellowship awarded to me by the University of Lucknow for 1930–1933.

I take this opportunity of expressing my deep sense of indebtedness to my Professor, Dr. K. N. Bahl, at whose suggestion I took up this work and who has guided the work at every step of the way and helped me with his criticism and advice. He has also found time to read through and correct the manuscript. Without his help this work would not have been possible. I also wish to express my grateful thanks to Mr. M. L. Bhatia for the pains he took in seeing the plates take their final form.

THE ENDOSKELETON.

The endoskeleton of the adult fish Rohu is more or less completely ossified and is made up of both replacing and investing bones. It consists of: (1) an *axial portion*, including (*a*) the *vertebral column* and the associated ribs and the skeleton of the median fins, and (*b*) the *skull*; and (2) an *appendicular portion*, including the skeleton of the paired fins and their girdles.

I. The Axial Skeleton.

(*A*) *The Vertebral Column.*

The vertebral column (figs. 1–8) is completely ossified and consists of 37 to 38 *amphicœlous* vertebræ. It is divisible into (1) an anterior trunk region in which the vertebræ bear movable ribs, and (2) a posterior caudal region, the vertebræ of which do not bear ribs but are provided with inferior hæmal arches.

(1) THE TRUNK VERTEBRÆ.

These are always twenty-one in number. The structure of a trunk vertebra is best studied by examining any one of the seventeen vertebræ from the fifth to the twenty-first.

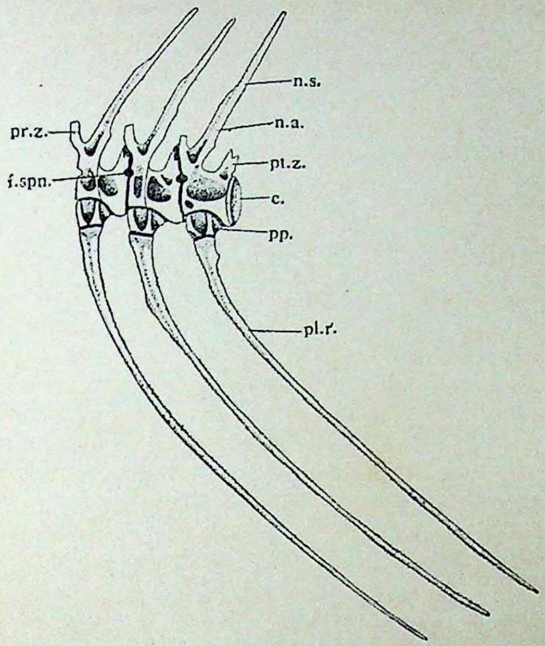

FIG. 1. Twelfth, thirteenth, and fourteenth trunk vertebræ seen from the left side. (× *ca* 1½). *c.*, centrum ; *f.spn.*, foramen for the spinal nerve ; *n.a.*, neural arch ; *n.s.*, neural spine ; *pl.r.*, pleural rib ; *pp.*, parapophyses ; *pr.z.*, pre-zygapophyses ; *pt.z.*, post-zygapophyses.

A typical trunk vertebra, e.g. the *fifteenth* (fig. 2), consists of a short deeply biconcave *centrum*, the two concavities communicating in the young by a narrow canal, the *notochordal canal* which perforates the body of the centrum ; in the adult, however, this notochordal canal becomes closed. The edges of the adjoining centra are united with one another by connective tissue ligaments and the biconvex space thus enclosed between them is filled with the remains of the notochord.

The centrum is watch-glass shaped both on its anterior and posterior surfaces like the centra of other Elasmobranchii and is therefore described as *amphicœlous*.[1] On the dorsal surface of the body of the vertebra, there is a large median

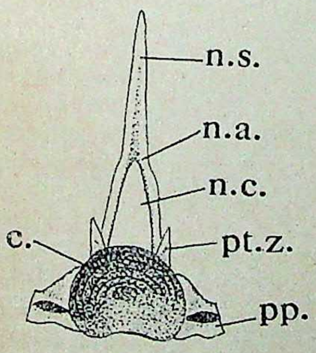

FIG. 2. Posterior view of a trunk vertebra. (× *ca* ½). *c.*, centrum ; *n.a.*, neural arch : *n.c.*, neural canal ; *n.s.*, neural spine ; *pp.*, parapophyses ; *pt.z.*, post-zygapophyses.

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[1] The character of the surfaces by which the vertebral centra articulate with one another varies in different fishes. When both the

depression, the deepest point of which reaches almost the centre of the vertebra. A similar median depression lies on the ventral surface, while on the sides there are two depressions, a dorso-lateral and a ventro-lateral. From the antero-lateral borders of the median dorsal depression arise a pair of processes directed obliquely backwards, which enclose the spinal cord and unite above to form the *neural arch*. The neural arch is produced dorsally into a long backwardly directed *neural spine*. The base of the neural arch is thickened and broadened and gives rise anteriorly to a pair of small blunt processes, projecting upwards and forwards called the *pre-zygapophyses*. These articulate with a corresponding pair of processes—the *post-zygapophyses*—projecting from the postero-lateral edges of the vertebra in front. The post-zygapophyses are directed upwards and backwards. The pre-zygapophyses and post-zygapophyses of two contiguous vertebræ enclose between them a pair of small foramina, one on each side, through which the spinal nerves pass out during life.

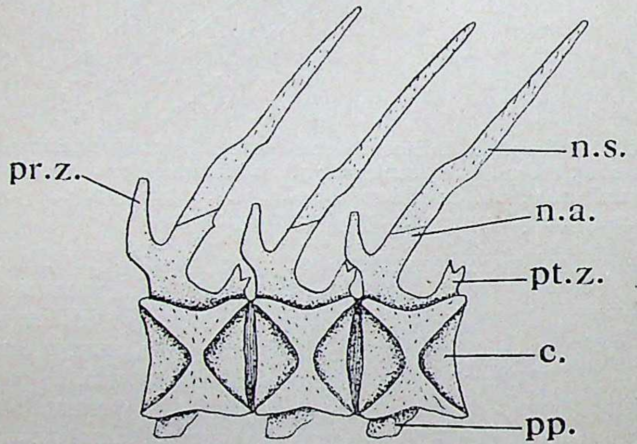

FIG. 3. Longitudinal section of three trunk vertebræ. (× *ca* 2¼). *c.*, centrum; *n.a.*, neural arch; *n.s.*, neural spine; *pp.*, parapophyses; *pr.z.*, pre-zygapophyses; *pt.z.*, post-zygapophyses.

From the ventro-lateral surfaces of the centrum arise a pair of short processes—the *parapophyses*—to each of which a rib is attached by ligaments. The parapophyses of the anterior thirteen or fourteen vertebræ—except the first four vertebræ—are distinct and separate and fit into the ventro-lateral depressions. In the last 3 or 4 trunk vertebræ, however, the para-

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anterior and posterior surfaces present deep concavities and look very much like a watch-glass, the vertebra is described as *amphicœlous*, e.g. in *Amia*, *Polypterus* and the Teleostei. When the centrum is convex in front and concave behind, the vertebra is said to be *opisthocœlous*, e.g. in *Lepidosteus*; while a vertebra with a concave anterior surface and a convex posterior surface is designated *procœlous*: such a centrum is not found in Fishes but the centra of the frog *Rana* afford a good example.

pophyses are firmly fused with the anterior edges of the ventrolateral depressions and pass outwards and downwards and slightly backwards. These posterior vertebræ also bear ventrally at their postero-lateral ends small spine-like processes directed backwards and downwards called the *postero-ventral processes.*

The first *four* trunk vertebræ (figs. 4 and 5) are highly modified since they serve to connect the air-bladder with the ear of the fish, and also afford surfaces for attachment of the highly developed constrictor muscles in connection with the inferior pharyngeal bones. Besides, the fourth vertebra forms a basal support for the *septum transversum* separating the pericardial from the peritoneal cavity. These four trunk vertebræ also differ

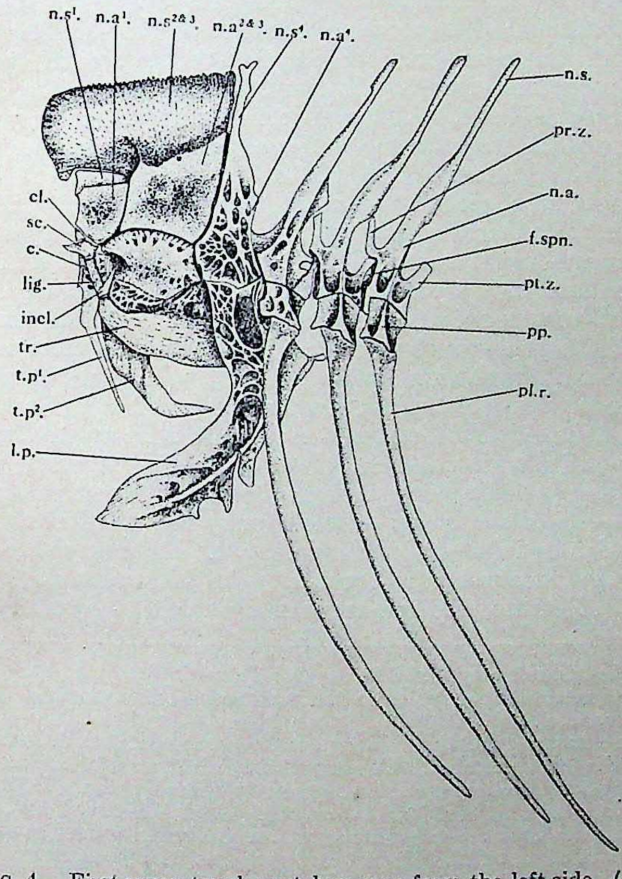

FIG. 4. First seven trunk vertebræ seen from the left side. (× *ca* 1⅓). *c.*, centrum; *cl.*, claustrum; *f.spn.*, foramen for the spinal nerve; *incl.*, intercalarium; *lig.*, ligament; *l.p.*, lateral process arising from the centrum of the fourth vertebra; *n.a.* $^{1-4}$, neural arches of the first, second, third, and fourth vertebræ; *n.s.* $^{1-4}$, neural spines of the first, second, third, and fourth vertebræ; *pl.r.*, pleural rib; *pp.*, parapophyses; *pr.z.*, pre-zygapophyses; *pt.z.*, post-zygapophyses; *sc.*, scaphium; *tr.*, tripus; *t.p.*$^{1-2}$, transverse processes of first and second vertebræ.

from the rest in the absence of ventro-lateral processes or parapophyses.

The first vertebra is connected with the skull and articulates with the outer edge of a deep conical depression at the posterior end of the basi-occipital bone. It has a very short cylindrical centrum, the anterior face of which is flat, but the posterior is concave. A pair of well-defined transverse processes project horizontally outwards. The neural arch is formed by two small bony pieces on each side—the *claustrum* and the *scaphium*—capped on the top by a median bony piece which forms a key-stone completing the arch above and giving off a short flattened neural spine. The claustrum and the scaphium form the two anteriormost elements of the chain of 'weberian ossicles'—a series of small bones which connect the air-bladder of the fish with its internal ear. The centra of the second and third vertebræ become fused together and are represented by a single large centrum—in fact the largest centrum in the entire vertebral column. Both its anterior and posterior surfaces are deeply concave. The anterior half of the centrum, representing the centrum of the second vertebra, bears a pair of transverse processes which are longer and stouter than those of the first vertebra and are situated immediately behind the latter. The posterior half of the centrum which represents the centrum of the third vertebra carries on each side a flattened triangular bone—the *tripus*—which forms the fourth and the most posterior element of the weberian apparatus and possibly represents the transverse process of the third vertebra. Stretching between the scaphium in front and the anterior end of the tripus behind, there is a stout ligament on each side in which is embedded a very small bony nodule with a short inwardly directed spine-like process—the *intercalarium*—which forms the third of the series of weberian ossicles—thus completing the chain in the following order: the *claustrum*, the *scaphium*, the *intercalarium*, and the *tripus*.[1] Of these, the tripus presses against the anterior wall

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[1] *The Homology of the Weberian Ossicles.*

Various attempts have been made to trace out the exact homology of these ossicles..

The claustrum and the scaphium as already noted complete the neural arch of the first vertebra. The scaphium has always been homologized with the neural arch of the first vertebra by various writers (Müller, 1853; Nusbaum, 1881; R. Wright, 1885; Bridge and Haddon, 1893), but the claustrum has been regarded either as a neural spine of the first vertebra or as a part of the skull. Hora (1922) regards the claustrum as an additional piece of the neural arch of the first vertebra.

The intercalarium has usually been regarded as a modified neural arch of the second vertebra (Müller, 1853) but Sagemehl (1885) was of opinion that it represented the rib of the second vertebra. According to Wright (1885) the neural arch of the first post-occipital region (Goodrich, Studies on the Structure and Development of Vertebrates, p. 592) forms the intercalarium. According to Bridge and Haddon (1893), this ossicle is a compound bone consisting of two elements—the neural arch of the of the air-bladder while the scaphium fits on the membrane covering the posterior paired openings of the atrium—a median posterior extension of the perilymph cavity of the ear which lodges the median sinus endolymphaticus, and is itself contained in the ex-occipital bones of the skull. The neural arches of the second and third vertebræ are fused together like their centra, the combined neural arch consisting of three distinct pieces—two ventro-lateral and a dorsal. Each ventro-lateral piece is a large bony plate which articulates ventrally with the body of the centrum and dorsally with the dorsal piece. The dorsal piece is a large flattened bone forming the dorsal portion of the neural arch with which are fused the flattened neural spines of the two vertebræ. These fused neural spines form a large and flattened keel-like structure which extends forwards and backwards, and articulates with the supra-occipital bone in front and with the neural spine of the fourth vertebra behind. The inwardly directed spine-like process of the intercalarium fits into the notch present along the anterior margin of each ventro-lateral piece of the two neural arches.

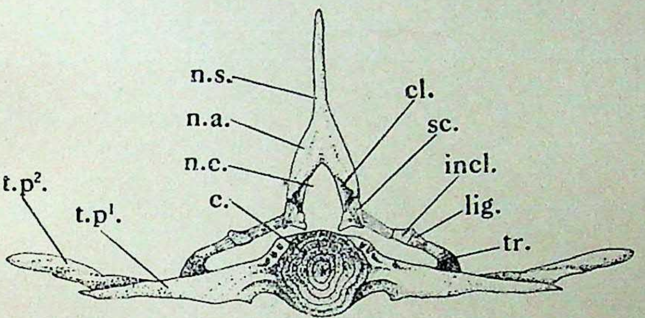

FIG. 5. Front view of the first and part of the second trunk vertebræ ; showing the relative position of the weberian ossicles. (× *ca* 2¼). *c.*, centrum ; *cl.*, claustrum ; *incl.*, intercalarium ; *lig.*, ligament ; *n.a.*, neural arch ; *n.c.*, neural canal ; *n.s.*, neural spine ; *sc.*, scaphium ; *t.p.*^{1}, transverse process of the first vertebra ; *t.p.*^{2}, transverse process of the second vertebra ; *tr.*, tripus.

The fourth vertebra is very well-developed. Its centrum is amphicœlous. Anteriorly its neural arch and spine abut against the fused neural arches and spines of the second and third vertebræ. On each side of the centrum arise a pair of stout

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second vertebra and its transverse process. According to Hora, the intercalarium represents a part or whole of the neural arch of the second vertebra.

The tripus has been homologized with either the transverse processes of the third vertebra or its ribs (Müller, 1853). Wright holds that the hæmal arch (probably including the rib of the first post-occipital segment) forms the tripus. According to Hora, the tripus is a compound bone formed by the coalescence of three distinct elements, the transverse process and rib of third vertebra and the rib of the fourth vertebra.

processes—the lateral and the ventro-mesial—which are flattened at their distal ends. Of these, the lateral are stouter than the ventro-mesial processes. These processes approximate ventrally towards the middle line and together form a sort of vertical wall immediately behind the basi-occipital bone. The anterior end of the air-bladder rests firmly against this vertical wall. These processes forming the vertical wall probably represent the transverse processes and the ribs of the fourth vertebra.

(2) THE CAUDAL VERTEBRÆ.

The *caudal region* comprises sixteen or seventeen vertebræ. A typical caudal vertebra (fig. 6), like that of a trunk vertebra,

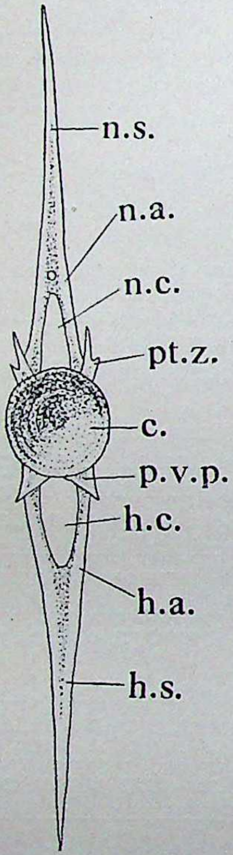

FIG. 6. Posterior view of a caudal vertebra. (× *ca* 2¼). *c.*, centrum ; *h.a.*, hæmal arch ; *h.c.*, hæmal canal ; *h.s.*, hæmal spine ; *n.a.*, neural arch ; *n.c.*, neural canal ; *n.s.*, neural spine ; *pt.z.*, post-zygapophyses ; *p.v.p.*, postero-ventral process.

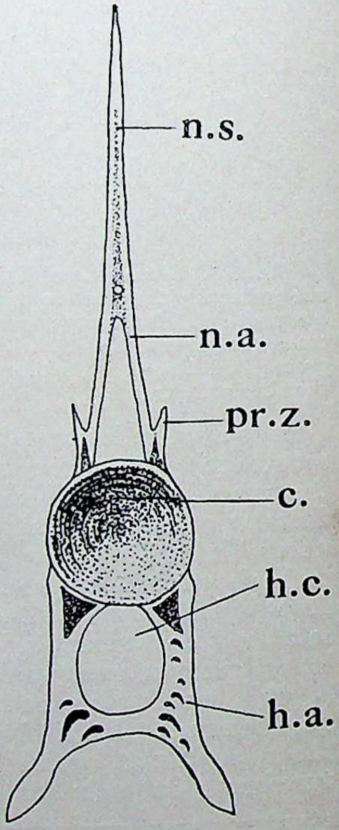

FIG. 7. Anterior view of the first caudal vertebra. (× *ca* 2¼). *c.*, centrum ; *h.a.*, hæmal arch ; *h.c.*, hæmal canal ; *n.a.*, neural arch ; *n.s.*, neural spine ; *pr.z.*, pre-zygapophyses.

consists of a short deeply biconcave centrum with a median dorsal depression, a median ventral depression and two lateral depressions on each side. The neural arch arises from the antero-lateral borders of the median dorsal depression and is produced above into a long backwardly directed *neural spine.* Articulating processes—the *pre-* and *post-zygapophyses*—are present in the same position as in a typical trunk vertebra. From the antero-lateral borders of the median ventral depression arise a pair of processes directed obliquely backwards; these, unlike the parapophyses of the trunk vertebræ, pass downwards and meet in the mid-ventral line, enclosing a space through which run the caudal artery and vein. These processes are called *hæmal arches.* Each hæmal arch is produced into a backwardly directed *hæmal spine.* The bases of the hæmal arches are thickened and broadened; from their anterior borders arise a pair of small blunt processes directed forwards and downwards—the *antero-ventral processes*; similar processes arise ventro-laterally from posterior end of the centrum; these are directed backwards and downwards and are known as *postero-ventral processes* and correspond to the similar processes present in the trunk vertebræ.

The last three caudal vertebræ (fig. 12) are specially modified for the support of the caudal fin. The last caudal

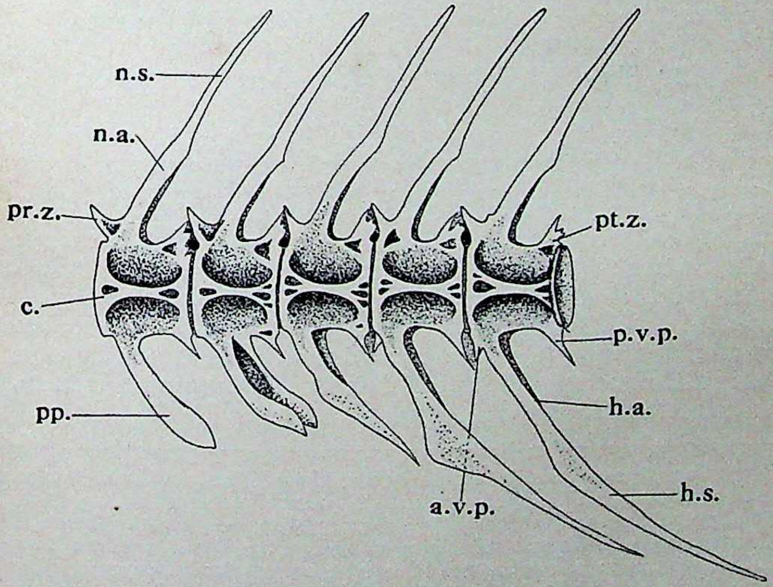

Fig. 8. The last pre-caudal and the first four caudal vertebræ seen from the left. (× *ca* 1½). *a.v.p.*, antero-ventral process; *c.*, centrum; *h.a.*, hæmal arch; *h.s.*, hæmal spine; *n.a.*, neural arch; *n.s.*, neural spine; *pp.*, parapophyses; *pr.z.*, pre-zygapophyses; *pt.z.*, post-zygapophyses; *p.v.p.*, postero-ventral process.

vertebra is produced behind into an upturned rod-like process—the *urostyle*—which probably represents several fused centra of this posterior region. The urostyle is a solid structure with a groove on its ventral surface wherein fit the proximal ends of four flat bony rods—the *hypurals*. There is no trace of the notochord in the urostyle of the adult fish. There is good reason to believe that a hypural is typically formed by the fusion of a fin-radial with the spine of a hæmal arch (*vide infra*, p. 310 and footnote). If this be true, the anteriormost hypural would belong to the last caudal centrum with which it articulates directly, while the remaining six would represent the hæmal spines of the centra fused to form the urostyle. On the evidence of the hypurals, therefore, the urostyle would represent six fused centra. While the hæmal spines are fused with the fin-radials to form the hypurals, the neural spine of the last caudal vertebra is free and there is a separate radial lying next to it adjoining the urostyle on its dorsal side.

The penultimate caudal vertebra and the one preceding it are modified only to the extent that their neural and hæmal spines are fused with the corresponding fin-radials to form the *epurals* and *hypurals* respectively. Thus there are altogether *nine* hypurals—six belonging to the urostyle and one each to the last three caudal vertebræ—and *two* epurals, one belonging to the penultimate vertebra and the other to the vertebra preceding it.

(B) The Skeleton of the Median Fins.

The skeleton of the median fins consists of two sets of structures: (1) a series of parallel bony rods called the *endoskeletal radials* or *somactidia*, and (2) the *dermal fin-rays* or *dermotrichia*. The endoskeletal radials lie imbedded within the muscles of the body and are developed in the median connective tissue septum which divides the body into right and left halves. Each typical radial consists of three segments: a *proximal*, a *mesial* and a *distal* segment. The dermotrichia support the free outstanding fold of the fin and are disposed on both of its sides, giving attachment to the radial muscles. Both the radials and the dermotrichia[1] are of mesoblastic origin.

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[1] The *dermotrichia* of fishes are of four different kinds. In the Elasmobranchii and the Holocephali, and probably also in the Acanthodii and the Ichthyotomi, these rays are unjointed, occasionally branched and composed of a fibrous substance of horny consistency without bone-cells. Such fin-rays are known as *ceratotrichia*. Similar rays found in larval forms and at the edges of the adult fin of the Teleostomes are known as *actinotrichia*.

Besides actinotrichia, the Teleostomes are provided with jointed, branched bony dermal rays which are developed outside the actinotrichia and are known as *lepidotrichia*.

In the Dipnoi are found jointed, branched dermal rays of bony

In *Labeo*, the dermotrichia are jointed and branched and have a bony texture, being in fact *lepidotrichia*. Besides these, a second set of delicate horny rays, the *actinotrichia*, persist at the free margins of the fins. These actinotrichia are homologous with the ceratotrichia of the Elasmobranchii and the Holocephali.

(1) THE DORSAL FIN.

The *dorsal fin* (figs. 9 and 10) is supported by fifteen to sixteen lepidotrichia seated on fourteen radials. Of the three pieces of each radial, the proximal segment is large and more or less dagger-shaped in appearance and is sometimes called the *interspinous bone* or the *axonost*; the mesial segment is short,

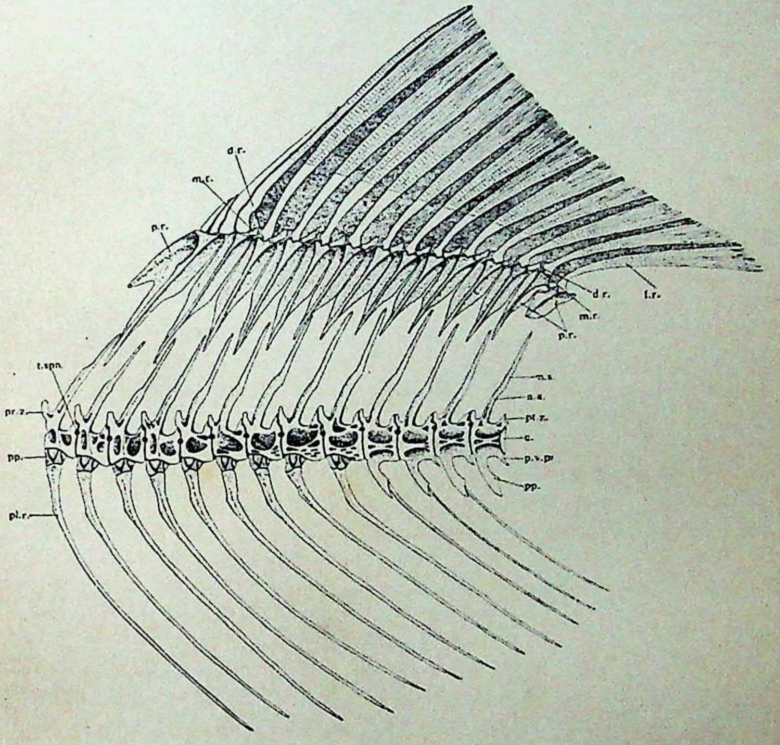

FIG. 9. Side view of the dorsal fin with the trunk vertebræ. (× *ca* ¾). *c.*, centrum; *d.r.*, distal piece of radial; *f.r.*, fin-ray; *f.spn.*, foramen for the spinal nerve; *m.r.*, mesial piece of radial; *n.a.*, neural arch; *n.s.*, neural spine; *pl.r.*, pleural rib; *pp.*, parapophyses; *p.r.*, proximal piece of radial; *pr.z.*, pre-zygapophyses; *pt.z.*, post-zygapophyses; *p.v.p.*, postero-ventral process.

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consistency known as *camptotrichia*. The camptotrichia are always provided with a proximal unsegmented region, deeply imbedded in the body and covered over by the body scales. Such scales also extend over the whole or the greater part of the fins, overlying the dermal rays.

while the distal piece is still further reduced in size, being represented only by a double bony nodule. The fourteenth or the last radial is reduced and is represented by the proximal segment only. The first interspinous bone lies between the neural spines of the ninth and tenth vertebræ and the last or the fourteenth lies between the neural spines of the twentieth and twenty-first vertebræ. The proximal end of each interspinous bone is narrow, more or less pointed and lies between two neural spines—hence the name *interspinous bone*; the distal portion is broad and thickened and is really made up of four longitudinal ridges, an anterior and a posterior and two laterals—which meet along the

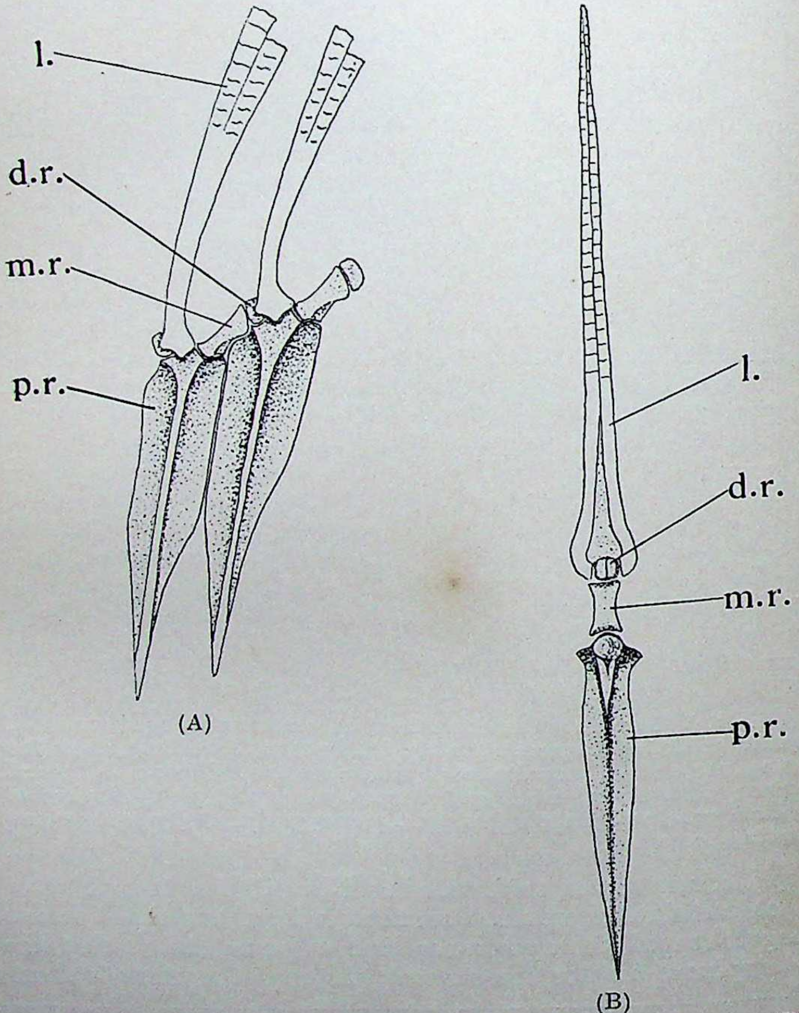

Fig. 10. (A) Two radials of the dorsal fin, seen from the left. (B) Radial and dermal ray from in front. (× *ca* 1½). *d.r.*, distal piece of radial; *l.*, lepidotrich; *m.r.*, mesial piece of radial; *p.r.*, proximal piece of radial.

axis of the bone. The distal end of each axonost is provided anteriorly with three facets, a median and two lateral, and posteriorly with a fourth median facet. Against the two lateral facets articulate the proximal ends of the paired lepidotrichia, the mesial segment of each radial articulates with the median posterior facet, while the distal segment of each radial articulates with the antero-median facet.

The mesial segment of each radial lies obliquely between its proximal segment and the lepidotrichia belonging to the succeeding radial. At its distal end, the mesial segment carries the distal double bony nodule which thus comes to lie in connection not with its own fin-ray but with the succeeding fin-ray (fig. 10A).

The distal segment of a radial thus comes to lie between the proximal ends of the two opposing lepidotrichia of a fin-ray which really belongs to the succeeding radial of the fin. The three segments of each radial are thus disposed in an obliquely backward direction, the mesial and distal segments lying behind the proximal segment at its upper end.

Of the sixteen fin-rays, the first three are unbranched and are spine-like in appearance, increasing in size from in front backwards while the remaining are branched and are thick and rounded proximally but thin and flattened distally. Except the first two, all the rays are jointed and the jointing is more conspicuous towards the distal end than at the base of the fin, where the divisions become obliterated. The branching is due to a repeated subdivision of the growing distal ends of the lepidotrichia. The lepidotrichia are present on both sides of the fin, but as they lie closely apposed together, they form apparently a single ray, which can, however, be easily split into two longitudinally. At their proximal extremity the two lepidotrichia slightly diverge and enclose between them the distal segment of the preceding radial to which they are firmly attached by ligaments. At their distal ends, the paired lepidotrichia enclose between them slender, unjointed structures of horny consistency, the *actinotrichia*. The actinotrichia are very short and rarely extend along more than one or two joints of the enclosing lepidotrichia.

The first three fin-rays are carried by the laterally expanded distal end of the proximal segment of the first radial, the third fin-ray which is the largest of the three, being the fin-ray proper of the first radial element. The last or the sixteenth ray is supported by the fourteenth radial. All the remaining fin-rays are supported by the proximal segments of their corresponding radials.

(2) THE ANAL FIN.

The *anal fin* (fig. 11) consists of a series of eight fin-rays, supported by seven radials. Of the seven radials, the first

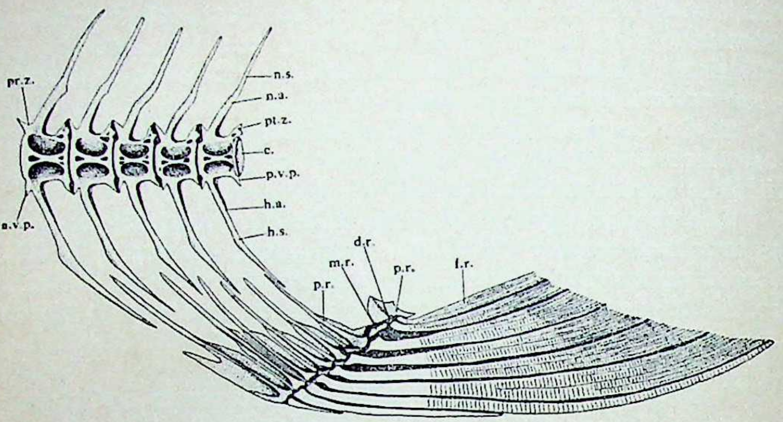

FIG. 11. Anal fin with its corresponding vertebræ. (× *ca* $1\frac{2}{5}$). *a.v.p.*, antero-ventral process ; *c.*, centrum ; *d.r.*, distal piece of radial ; *f.r.*, fin ray ; *h.a.*, hæmal arch ; *h.s.*, hæmal spine ; *m.r.*, mesial piece of radial ; *n.a.*, neural arch ; *n.s.*, neural spine ; *p.r.*, proximal piece of radial ; *pr.z.*, pre-zygapophyses ; *pt.z.*, post-zygapophyses ; *p.v.p.*, postero-ventral process.

six are well-developed, while the seventh is small. The structure of the radials and the fin-rays and their articulations are very similar to those of the dorsal fin. The first inter-spinous bone lies in between the hæmal spines of the twenty-fifth and twenty-sixth vertebræ, while the sixth lies between the hæmal spines of the twenty-eighth and twenty-ninth vertebræ. The first three fin-rays are unbranched while the rest are branched. They are transversely jointed and flexible structures with more or less flattened distal ends. The posterior rays decrease in size when followed backwards.

(3) THE CAUDAL FIN.

The *caudal fin* (fig. 12) is a large vertically expanded structure, supported by a number of flattened bony rods which lie on both the dorsal and ventral sides of the urostyle. Three bony rods—two *epurals* and a free *radial*—lie on the dorsal side of the urostyle while nine rods—the *hypurals*—lie on the ventral side of the urostyle. The epurals and the hypurals vary in size but together with the urostyle form a symmetrical vertical structure to which the fin-rays are attached in two symmetrical halves. According to Goodrich,[1] the epurals represent neural spines which have fused with the radials, while the hypurals represent hæmal spines fused with the radials. It may be noted that behind the two epural bones, one separate radial persists and lies immediately on the dorsal side of the urostyle adjoining the free neural spine of the last caudal vertebra. The two epurals and the separate radial support the original epichordal lobe of the tail fin which is very much reduced but persists dorsally at the base of the fin. It contains only nine small fin-rays which do not reach the extremity of the fin. These rays are all unbranched but the last four are jointed. Of the nine fin-rays, four are carried by the first epural, three by the second epural while the remaining two are carried by the free radial.

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[1] Goodrich, E. S.—*Studies on the Structure and Development of Vertebrates*, pp. 101 and 109 (London : 1930).

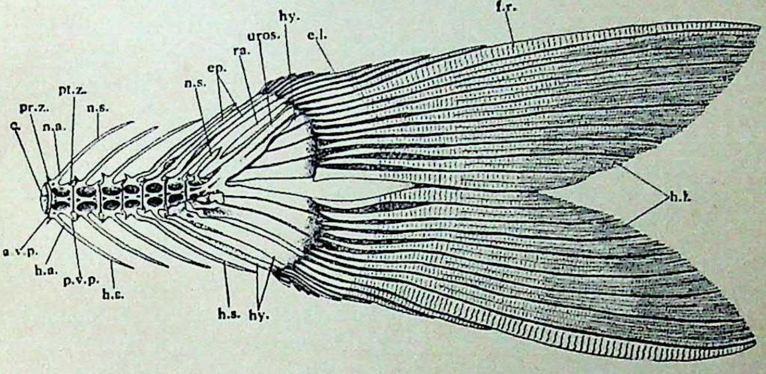

FIG. 12. Caudal fin and the caudal vertebræ. (×*ca* Nat. size). *a.v.p.*, antero-ventral process ; *c.*, centrum ; *e.l.*, epichordal lobe ; *ep.*, epural ; *f.r.*, fin-ray ; *h.a.*, hæmal arch ; *h.l.*, hypochordal lobe ; *h.s.*, hæmal spine ; *hy.*, hypural : *n.a.*, neural arch ; *n.s.*, neural spine ; *pr. z.*, pre-zygapophyses ; *pt.z.*, post-zygapophyses ; *p.v.p.*, postero-ventral process ; *ra.*, radial ; *uros.*, urostyle.

By far the greater part of the adult tail fin is really the original hypochordal lobe which is supported by the urostyle and the hypurals. This hypochordal lobe becomes secondarily divided into a dorsal and a ventral portion, the dorsal containing *ten* jointed fin-rays and the ventral *nine*. Besides these nine rays, the ventral portion carries another *seven* fin-rays which, like those of the epichordal lobe, are unbranched and do not reach the extremity of the fin. They lie at the base of the fin at its junction with the body on the ventral side.

The dorsal lobe is supported by the urostyle and *four* hypurals which lie next to the urostyle on its ventral side. The dorsalmost hypural is the smallest while the ventralmost is the largest. Of the ten fin-rays in the dorsal lobe, the urostyle carries only one, the first three hypurals carry two rays each while the last hypural carries three rays. The first fin-ray is unbranched while the remaining nine are branched.

The ventral lobe is supported by five hypurals, the first or the most posterior of which lying next to the dorsal hypurals is fused with the base of the urostyle on its ventral side ; the second hypural lies free and is only connected with the posterior end of the last centrum by means of connective tissue ; the third hypural articulates directly with the ventral side of the last centrum, the fourth articulates with the centrum of the penultimate caudal vertebra, while the fifth hypural fuses with the centrum of the vertebra preceding the last two. Of the nine fin-rays which form by far the greater part of the ventral lobe, the first hypural carries two, the second and third hypurals carry three rays each while the fourth hypural carries only one ray. The first eight are branched while the last or the ninth ray is unbranched. Of the seven small fin-rays, which do not reach the extremity of the fin, two are carried by the fourth hypural while remaining five are carried by the fifth or the ventralmost hypural. The fin-rays of the caudal fin, like those of the dorsal and anal fins, are paired structures, capable of being split into two longitudinally. The two lepidotrichia of a ray diverge at their proximal ends and enclose between them the distal ends of the epurals, the urostyle, and the hypurals. Distally the two lepidotrichia enclose between them a pair of short actinotrichia. Each ray is thick and rounded proximally but thin and flattened distally.

In *Rohu* the posterior end of the notochordal axis (the urostyle) is bent upwards and therefore the epichordal lobe is very much reduced and includes very few (only *nine*) fin-rays ; it is the hypochordal lobe (carrying *twenty-six* fin-rays) which forms the major portion of the caudal fin and is divided secondarily into a so-called *dorsal* and a *ventral* lobe. Externally the two lobes are equal in size and are symmetrically placed, but, as pointed above, the greater part of the skeleton of the caudal fin lies ventral to the vertebral axis and is really asymmetrically placed. Such an outwardly symmetrical tail fin is called *homocercal*.[1]

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[1] In some fishes the vertebral axis is continued straight into the caudal fin, thus dividing the latter into two equal and continuous lobes—a dorsal or the *epichordal lobe* and a ventral or the *hypochordal lobe.* Such a caudal fin, symmetrical both externally and internally, is called *protocercal* (diphycercal). This condition is generally regarded as the most primitive and occurs in the Holocephali, Dipnoi, *Polypterus*, and a few Selachii and Teleostei.

In some other fishes the posterior end of the notochord along with the vertebral axis is bent dorsalwards and the fin-rays are distributed asymmetrically on the two sides of the vertebral column, the ventral hypochordal lobe of the fin being much more developed than the epichordal. Such a caudal fin, asymmetrical both externally and internally, is called *heterocercal.* Such tails are found in nearly all the Elasmobranchii together with the Chondrostei, *Lepidosteus*, and *Amia*.

In a great majority of Teleostean fishes, the vertebral axis is bent upwards and is shortened giving rise to a very much reduced epichordal lobe and a much enlarged hypochordal lobe. The hypochordal lobe further becomes secondarily divided into two symmetrical dorsal and ventral lobes. Such an externally symmetrical but internally asymmetrical tail-fin is called *homocercal*.

(*C*) *The Ribs.*

The *ribs* (figs. 1, 4 and 9) are a series of paired segmentally arranged bony rods, attached to the distal ends of the parapophyses of the trunk vertebræ. These are known as *pleural ribs*, of which there are *seventeen* pairs, the first pair being always attached to the fifth trunk vertebra. These ribs are long and slender and curve downwards and backwards between the muscles and the peritoneum, thus encircling the abdominal cavity. The proximal end of each rib is dilated, while the distal end is slender and more or less pointed. The anterior ribs are thicker and more curved than the posterior ones.

Associated with these pleural ribs are a second series of rib-like bones, the *inter-muscular bones.* These are slender curved bones, Y-shaped in appearance, the two limbs of the Y being directed proximally and the shank distally. They arise from the neural arch of each vertebra both in the trunk and caudal regions, curve outwards and upwards and slightly backwards. Their distal ends may be unifid, bifid or multifid. They serve to support the connective tissue septa between the myomeres.

The vertebræ, myotomes, and the inter-muscular bones show a typical segmental arrangement.

(*D*) *The Skull.*

The *chondrocranium*[1] of Teleostei, like that of most Gnathostomes, consists essentially of a posterior *basal plate* to which the *auditory capsules* become attached and an anterior *trabecular region* connected with the nasal capsules. The primitive side-wall[2] is very incomplete and is derived from an *orbital cartilage* which joins the auditory capsule behind and the nasal capsule in front. The visceral *palato-quadrate* arch articulates with the auditory capsule behind by an *otic process* and with the trabecular region in front by a *basal process*.

The *skull* of an adult specimen of *Labeo rohita* is an extremely complex structure; it is fully ossified and is composed of a large number of both replacing and investing bones. It consists

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Lastly, many Teleosteans show cases of disguised or modified homocercy. In Anguilliformes, Notopteridæ, Gymnarchidæ, Macruridæ, Zoaroidæ, etc., the hypochordal fin is reduced in size while the dorsal and anal fins elongate until a continuous fin-fold is re-established. Such tails are called *isocercal*. Again, in *Fierasfer* and *Orthogoriscus*, the caudal fin completely disappears and the axis becomes truncated, resulting in what is called a *gephyrocercal* tail.

[1] Goodrich—*Studies on the Structure and Development of Vertebrates*, p. 232 (London : 1930).

[2] Goodrich—'The pila antotica of other groups fails to develop in Teleostomes, possibly on account of the formation of a posterior eye-muscle canal', *ibid.*, p. 245.

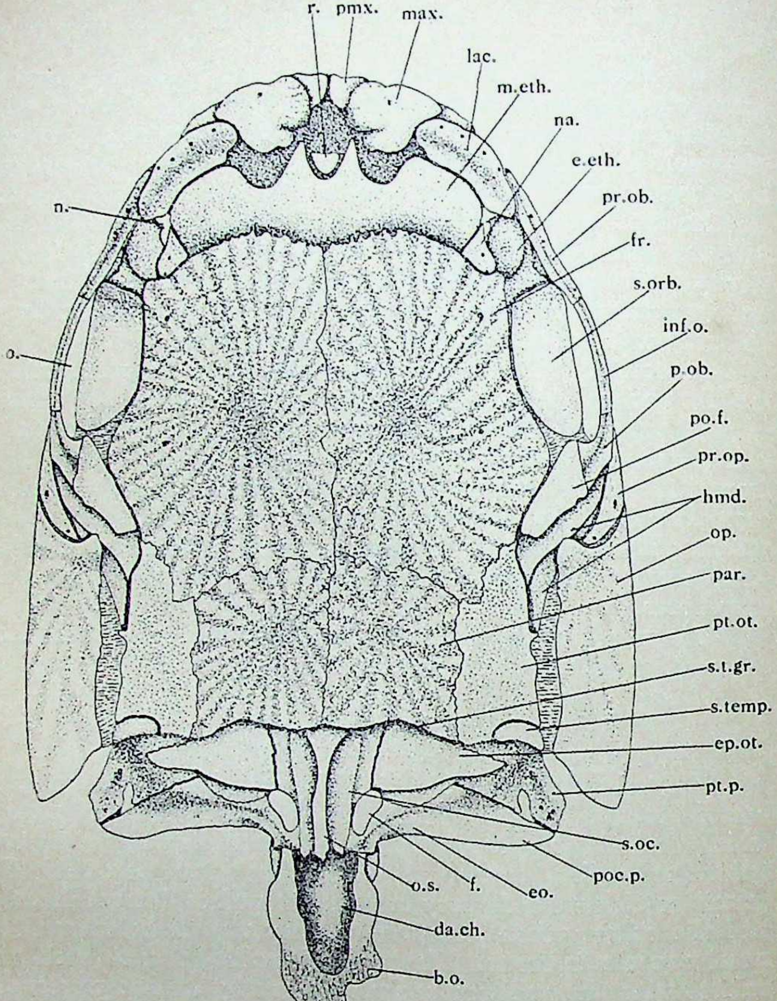
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FIG. 13. Dorsal view of the skull. (× *ca* ¾). *b.o.*, basi-occipital ; *da.ch.*, channel lodging the dorsal aorta ; *e.eth.*, ecto-ethmoid ; *eo.*, ex-occipital ; *ep.ot.*, epiotic ; *f.*, fenestra ; *fr.*, frontal ; *hmd.*, hyomandibular ; *inf.o.*, infra-orbital ; *lac.*, lacrymal ; *max.*, maxilla ; *m.eth.*, mesethmoid ; *n.*, nostril ; *na.*, nasal ; *o.*, orbit ; *op.*, opercular ; *o.s.*, occipital spine ; *par.*, parietal ; *pmx.*, pre-maxilla ; *p.ob.*, post-orbital ; *poc.p.*, par-occipital process ; *po.f.*, post-frontal ; *pr.ob.*, pre-orbital ; *pr.op.*, pre-opercular ; *pt.ot.*, pterotic ; *pt.p.*, pterotic process ; *r.*, rostral ; *s.oc.*, spura-occipital ; *s.orb.*, supra-orbital ; *s.temp.*, supra-temporal ; *s.t.gr.*, supra-temporal groove.

of : (1) the *cranium*, enclosing and protecting the brain, (2) the *sense-capsules* (the olfactory and the auditory) which protect the olfactory and auditory organs, and (3) the *visceral arches*, which form the two jaws, the suspensorium for the jaws, and the hyobranchial skeleton to support the gills. Of these, the cranium and the sense capsules are immovably united together and form one compact structure—the *skull proper,* while the *visceral skeleton* is only loosely attached to the cranium and the sense capsules in a dried skull.

We shall first describe the *skull proper* and then the *visceral skeleton.*

(1) THE SKULL PROPER.

The *skull proper* (figs. 13–18) forms an elongated wedge-shaped structure, the anterior being the thin end and the posterior the thick end of the wedge. The skull is about one and a half times as long as it is broad and at its broadest nearly twice as broad as it is deep at the posterior end. The dorsal surface of the skull is completely covered with bones; it is flat in the mid-dorsal line but slopes gradually towards the sides thus forming a more or less convex dorsal surface. The extreme posterior portion of the dorsal surface of the skull is slightly depressed forming a shallow groove—the *supra-temporal groove*—which extends from the postero-lateral margins inwards to the median *occipital spine.* The posterior surface of the skull forms a more or less straight vertical plate perforated by the median *foramen magnum* and two large oval *fenestræ,* one on either side of the median line. Ventrally the skull is incomplete; there are two large and deep depressions in the posterior region one on either side of the middle line which are surrounded by the otic bones and are filled during life with strong dorsal muscles of the inferior pharyngeal bones. Similarly, there are two more or less triangular cavities—the *orbits*—in the anterior region for lodging the eye-balls. Along the mid-ventral line, however, the skull is completely covered with bone. At the posterior end, the mid-ventral region of the skull is prolonged behind into a large vertebra-like process bearing a flat ventral plate—the so-called *masticatory process.*

The skull proper can be distinguished into: (1) a posterior *occipital region,* connected with the vertebral column; (2) the *otic regions,* comprising the bones of the *auditory capsules*; (3) an *orbito-temporal region*; and (4) an anterior *nasal* or *ethmoidal region.*

(*a*) *The Occipital Region.*—The occipital region forms the posterior part of the skull in the median line, being marked by the presence of a small median opening, the *foramen magnum,* through which the spinal cord is continued into the brain. The occipital region is formed of a *supra-occipital,* a *basi-occipital,* and the paired *ex-occipital* bones.

The *supra-occipital* forms the median posterior portion of the dorsal surface of the skull roofing the cranial cavity behind. It is more or less convex on its outer surface but concave on its inner. Two distinct portions can be distinguished in the supra-occipital bone, i.e. (1) a *dorsal portion* and (2) a *postero-inferior* *portion*. The dorsal portion is wider at its anterior than at its posterior end and is overlapped by the *parietals* in front while laterally it adjoins the epiotic bones. From its dorsal surface arises a median vertical crest—the *occipital spine* or *keel*—which is flanked by two prominent but low crests; these converge below to form a median wedge-shaped process inserted between the dorsal ends of the two ex-occipitals. This median wedge-shaped process together with the converging portions of the low lateral crests constitute the postero-inferior portion of the supra-occipital. The supra-occipital in *Labeo* does not form the dorsal boundary of the foramen magnum but, on the other hand, is completely shut off from it.

The *ex-occipitals* are large and extensive bones, each consisting of (1) a *basal plate* forming part of the floor of the cranial cavity, (2) a large wing-like lateral *par-occipital process* which not only forms the side-wall of the cranial cavity but also forms the posterior boundary of the auditory capsule, and (3) a small *dorsal process* enclosing the foramen magnum. The basal plate of each ex-occipital is a flat piece of bone which meets the corresponding plate of the other side in the mid-ventral line and forms the hinder portion of the floor of the cranial cavity, the two basal plates together completely covering the anterior half of the basi-occipital bone. The posterior end of each basal plate presents an obliquely flattened surface by which it articulates behind with the basi-occipital; the inner surfaces of the two basal plates by which they articulate with each other are grooved and the two grooves on articulation enclose a narrow canal in which lies the *median sinus endolymphaticus*.[1] Laterally each ex-occipital is expanded into a large wing-like process, the two parts of which lie almost at right angles to each other. The outer larger part forms the main portion of the posterior vertical wall of the skull while the smaller inner part of each wing forms the side-wall of the cranial cavity and part of the inner posterior wall of the ventral cup-like hollow of the auditory region. Each wing-like process is suturally connected dorsally both with the pterotic and the epiotic. The inner surface of each wing bears a well-marked ridge which is continuous with a similar ridge on the pterotic on the one hand and the pro-otic on the other and encloses a part of the horizontal semi-circular canal of the internal ear. Besides, this wing-like portion also encloses a part of the posterior semi-circular canal. Posteriorly, on each side of the middle line, each ex-occipital gives off a small *dorsal process* which meets the corresponding process of the other side forming an arched bridge, which surrounds the foramen magnum both dorsally and laterally and also encloses the median wedge-shaped process of the supra-occipital. Enclosed between the lateral par-occipital process externally and the dorsal process

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[1] In Cypriniformes, the right and left membranous labyrinths of the internal ear join across below the medulla by a transverse canal; from this canal are given off posteriorly a pair of lateral outgrowths, the *sacculi* and a median outgrowth, the *sinus endolymphaticus*. (Goodrich—*Studies on the Structure and Development of Vertebrates*, p. 591 (London: 1930).

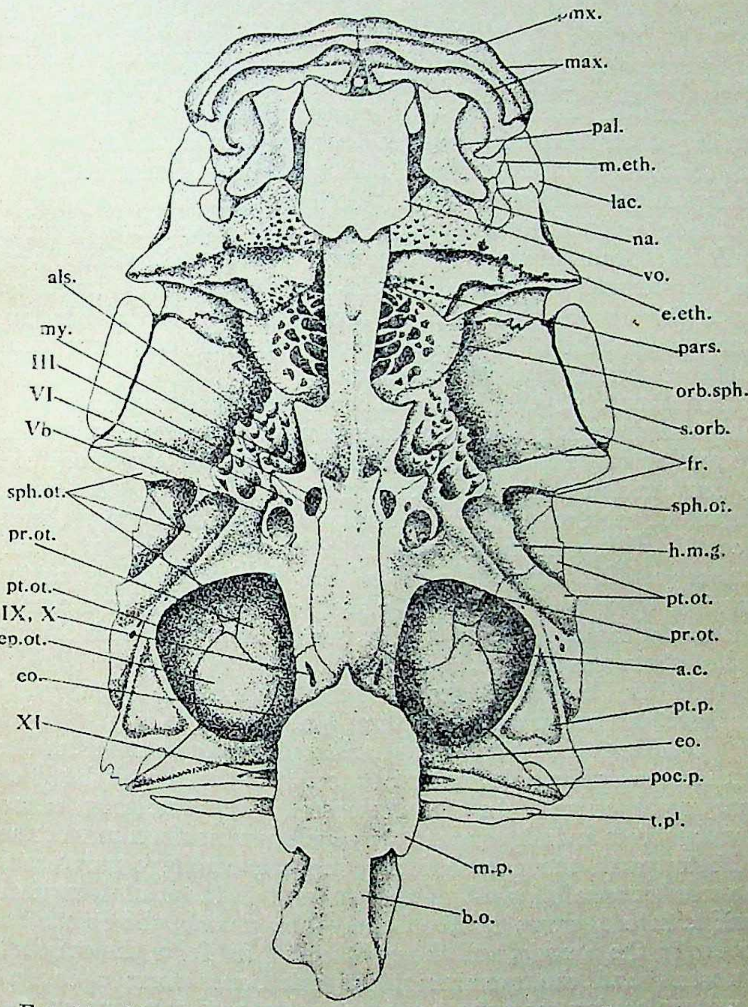

FIG. 14. Ventral view of the skull. (× *ca* $\frac{1}{3}$). *a.c.*, auditory capsule ; *als.*, ali-sphenoid ; *b.o.*, basi-occipital ; *e.eth.*, ecto-ethmoid ; *eo.*, ex-occipital ; *ep.ot.*, epiotic ; *fr.*, frontal ; *h.m.g.*, groove for hyomandibular ; *lac.*, lacrymal ; *max.*, maxilla ; *m.eth.*, mesethmoid ; *m.p.*, masticating process of basi-occipital ; *my.*, myodome ; *na.*, nasal ; *orb. sph.*, orbito-sphenoid ; *pal.*, palatine ; *pars.*, para-sphenoid ; *pmx.*, pre-maxilla ; *poc. p.*, par-occipital process ; *pr.ot.*, ptootic ; *pt.ot.*, pterotic ; *pt.p.*, pterotic process ; *s.orb.*, supra-orbital ; *sph.ot.*, sphenotic ; $t.p.^1$, transverse process of the first vertebra ; *vo.*, vomer ; *III*, foramen for the third cranial nerve ; *Vb.*, foramen for the main branch of the fifth cranial nerve ; *VI*, *IX*, and *X*, foramina for the sixth, ninth, and tenth cranial nerves ; *XI*, foramen for the occipito-spinal nerve.

internally lies a large oval *fenestra*. This fenestra pierces the ex-occipital of each side and forms a characteristic feature of the skull of Cyprinoid fishes. It is covered over by a thick tough membrane in the living condition.

The *basi-occipital* is a large drain-pipe shaped bone thickest in the middle. It is about twice as long as it is wide. The posterior half of the bone presents the appearance of an open drain, while in the anterior half, the 'drain' is roofed over by a vertebra-like bony piece—the *occipital condyle*. The posterior surface of the occipital condyle bears a deep conical depression like that of a centrum, to which the vertebral column is attached by ligaments without a distinct articulation. The edges of the posterior 'open drain-like' part support the first three vertebræ, while the drain-channel itself serves to lodge the dorsal aorta. On its ventral surface, the basi-occipital bears a large oval *masticatory process*,[1] which is covered over during life by a horny pad; behind the masticatory process, the bone is produced into a prominent mid-ventral ridge.

In front of the occipital condyle, the basi-occipital is compressed dorso-ventrally and presents two longitudinal shallow grooves on its dorsal surface, each of which forms a closed canal in conjunction with a corresponding groove on the ventral surface of each ex-occipital. These lateral canals lodge the two sacculi[2] of the internal ear. In a complete skull, the dorsal surface of this anterior part of the basi-occipital is entirely covered over by the basal plates of the two ex-occipitals. Anteriorly the basi-occipital is suturally connected with the hind end of the parasphenoid.

All the bones of the occipital region are preceded by cartilage and are therefore replacing bones.

(*b*) *The Otic Region.*—The *auditory capsule* in the skull of all craniates lies morphologically between the facial and the glosso-pharyngeal nerves. In the Teleostei, each auditory capsule develops from an independent *otic cartilage* which becomes connected below with the parachordals; the otic cartilage grows round the *membranous labyrinth* of the ear and in the adult is typically ossified into a group of five bones—the *prootic*, the *epiotic*, the *sphenotic*, the *pterotic*, and the *opisthotic*. In *Rohu*, the opisthotic is absent[3] and the remaining four otic bones form a compact structure having the appearance of an inverted cup, one on each side of the hinder part of the cranial cavity. In a cleaned skull, the hollow of each auditory capsule is empty but in the living fish the hollow is filled up by the dorsal muscles of the inferior pharyngeal bones.

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[1] According to Nusbaum's recent account, three vertebral segments in *Cyprinus* combine with the skull behind the vagus foramen to form the basi-occipital region; and the hæmal arches of the second and third fuse to form the large ventral masticatory process enclosing the aorta while their neural spines contribute to the supra-occipital. (Goodrich—*Studies on the Structure and Development of Vertebrates*, p. 592 (London: 1930).

[2] cf. Footnote, p. 314.

[3] It is possible that it fuses early with the ex-occipital forming the par-occipital process.

The *prootic* is a large irregular bone which forms the antero-mesial wall of the auditory capsule and lodges a portion of the anterior vertical and horizontal semi-circular canals. We can roughly distinguish two portions in this bone—(1) a large thick *ventro-lateral portion* and (2) a small *lateral portion*, the two forming an angle of about 120° with each other and separated by a ridge which is very well-marked anteriorly. Dorsally, the posterior part of the ventro-lateral portion of the prootic is produced into a process which meets the corresponding process of the opposite side in the middle line, leaving an anterior V-shaped notch for the pituitary fossa; ventrally, the ventro-lateral portions of the two prootics do not meet in the middle line but

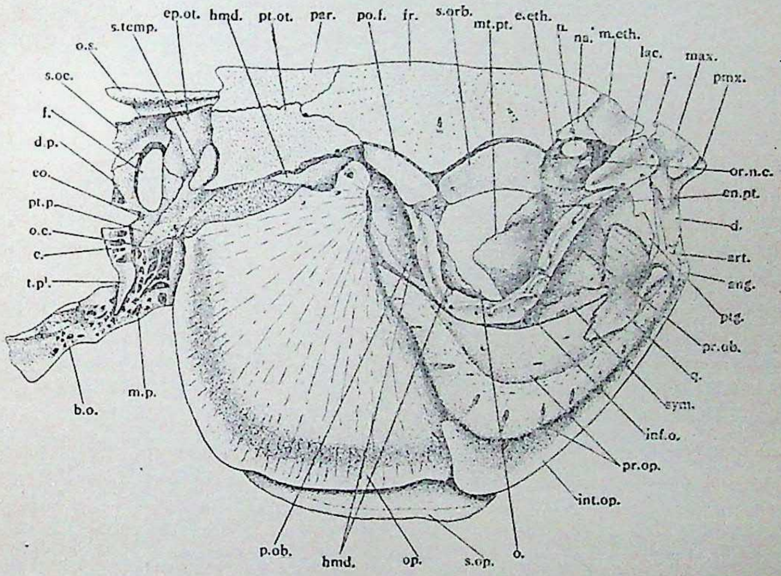

FIG. 15. Lateral view of the skull. ($\times ca \frac{1}{5}$). *ang.*, angular; *art.*, articular; *b.o.*, basi-occipital; *c.*, centrum; *d.*, dentary; *d.p.*, dorsal process of ex-occipital; *e.eth.*, ecto-ethmoid; *en.pt.*, endo-pterygoid; *eo.*, ex-occipital; *ep.ot.*, epiotic; *f.*, fenestra; *fr.*, frontal; *hmd.*, hyomandibular; *inf.o.*, infra-orbital; *int.op.*, inter-opercular; *lac.*, lacrymal; *max.*, maxilla; *m.eth.*, mesethmoid; *m.p.*, masticating process of basi-occipital; *mt.pt.*, meta-pterygoid; *n.*, nostril; *na.*, nasal; *o.*, orbit; *o.c.*, occipital condyle; *op.*, opercular; *or.n.c.*, anterior opening of the orbito-nasal canal; *o.s.*, occipital spine; *par.*, parietal; *pmx.*, pre-maxilla; *p.ob.*, post-orbital; *po.f.*, post-frontal; *pr.ob.*, pre-orbital; *pr.op.*, pre-opercular; *ptg.*, ecto-pterygoid; *pt.ot.*, pterotic; *pt.p.*, pterotic process; *q.*, quadrate; *r.*, rostral; *s.oc.*, supra-occipital; *s.op.*, sub-opercular; *s.orb.*, supra-orbital; *s.temp.*, supra-temporal; *sym.*, symplectic; *t.p.*[1], transverse process of first vertebra.

articulate mesially with the parasphenoid. The prootic has a large semi-circular anterior border which articulates below with the ali-sphenoid, laterally with the sphenotic and dorsally with the pterotic. The posterior border is more or less straight and vertical and articulates with the anterior edge of the ex-occipital. Embedded in its inner wall which constitutes the postero-lateral wall of the cranial cavity, lie the ampullæ of the semi-circular canals and the utriculus of the internal ear. On its postero-dorsal surface just beneath the medulla lies the transverse canal joining the two membranous labyrinths. The *lateral portion* of the prootic presents a concave surface and forms the inner anterior wall of the auditory capsule. It articulates with the ex-occipital and the epiotic behind and with the sphenotic in front.

The *epiotic* is a bowl-shaped bone which forms the greater part of the roof of the auditory capsule. Looked at from the ventral side, it shows the deep hollow of the bowl and is completely surrounded by the ex-occipital behind and the sphenotic in front, while the pterotic lies on its outer and the prootic on its inner side. On the dorsal surface of the skull, the epiotic is seen to lie on each side of the median supra-occipital and is overlapped by the posterior edge of the parietal in front and suturally connected with the dorsal border of the par-occipital process of the ex-occipital. On its outer border, the epiotic is produced into a splint-like process which partially covers the posterior part of the pterotic bone. The epiotic lodges a portion of the anterior and the posterior vertical semi-circular canals.

The *pterotic* is a large irregularly triangular bone which forms the outer wall of the auditory capsule and encloses a part of the horizontal semi-circular canal. Its anterior portion is at a higher level lying flush with the parietals and the frontals, while the posterior portion—the *pterotic process*—is at a lower level and is connected with the epiotic and the par-occipital process of the ex-occipital bone. Its outer crescentic border is smooth but the inner border is very much crenated to form articulating wavy sutures with the frontals, the parietals and the epiotics. The ventral side of the pterotic presents an uneven surface with a strongly marked ridge which is continuous with similar ridges on the ex-occipital and the prootic, thus forming a continuous circular ridge which encloses the horizontal semi-circular canal of the internal ear. The outer edge is connected with the upper border of the opercular bone by means of stout ligaments, while a small *supra-temporal* bone fits into a shallow depression lying near the junction of the pterotic process with the main anterior portion of the pterotic. Lying immediately behind and beneath the supra-temporal is the *post-temporal* which covers the greater part of the pterotic process. On its ventro-lateral border, the pterotic presents a well-marked shallow groove—the *hyomandibular* *groove*—which continues into a similar groove on the sphenotic in front. Into this groove fits the upper end of the hyomandibular bone, by means of which the jaws are suspended to the cranium.

The *sphenotic* is the anteriormost of the auditory bones

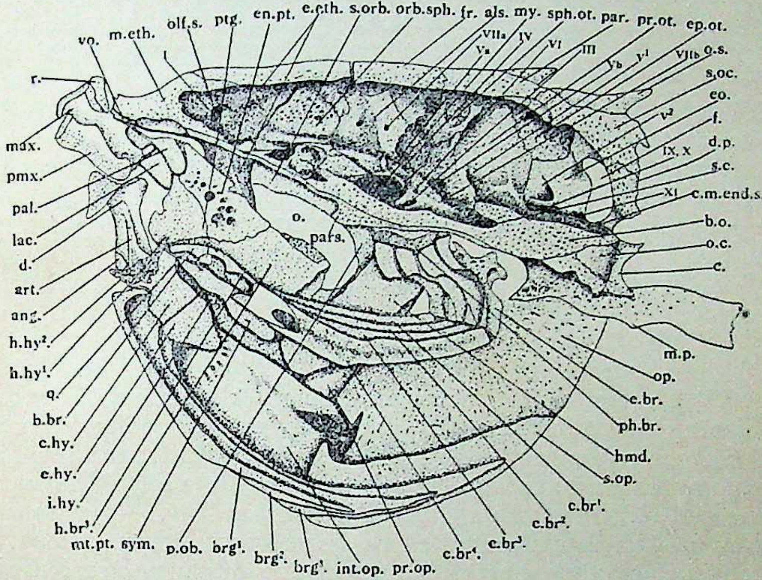
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FIG. 16. A median section of the skull and the visceral arches. (× *ca* ¼). *als.*, ali-sphenoid; *ang.*, angular; *art.*, articular; *b.br.*, basi-branchial; *b.o.*, basi-occipital; *brg.*$^{1-3}$, first, second, and third branchiostegal rays; *c.*, centrum of the first trunk vertebra; *c.br.*$^{1-4}$, first, second, third, and fourth ceratobranchial; *c.hy.*, cerato-hyal: *c.m.end.s.*, canal for median endolymphatic sinus; *d.*, dentary; *d.p.*, dorsal process of ex-occipital; *e.br.*, epi-branchial; *e.eth.*, ecto-ethmoid; *e.hy.*, epi-hyal; *en.pt.*, endo-pterygoid; *eo.*, ex-occipital; *ep.ot.*, epiotic; *f.*, fenestra; *fr.*, frontal; *h.br.*^{3}, third hypo-branchial; *h.hy.*$^{1-2}$, first and second hypo-hyal; *hmd.*, hyomandibular; *i.hy.*, inter-hyal; *int.op.*, inter-opercular; *lac.*, lacrymal; *max.*, maxilla; *m.eth.*, mesethmoid; *m.p.*, masticating process of basi-occipital; *mt.pt.*, meta-pterygoid; *my.*, myodome; *o.*, orbit; *o.c.*, occipital condyle; *olf.s.*, olfactory sac; *op.*, opercular; *orb.sph.*, orbito-sphenoid; *o.s.*, occipital spine; *pal.*, palatine; *par.*, pæietal; *pars.*, para-sphenoid; *ph.br.*, pharyngo-branchial; *pmx.*, pre-maxilla; *p.ob.*, post-orbital; *pr.op.*, pre-opercular; *pr.ot.*, prootic; *ptg.*, ecto-pterygoid; *q.*, quadrate; *r.*, rostral; *s.c.*, saccular canal; *s.oc.*, supra-occipital; *s.op.*, sub-opercular; *s.orb.*, supra-orbital; *sph.ot.*, sphenotic; *sym.*, symplectic; *v.*^{1}, vacuity through which the anterior vertical and horizontal semi-circular canals after leaving the utriculus enter the otic bones in which they are lodged; *v.*^{2}, vacuity through which the posterior vertical and horizontal semi-circular canals leave the otic bones to join the utriculus; *vo.*, vomer; *I*, *III*, and *IV*, foramina for the first, third, and fourth cranial nerves; *Va*, foramen for the ophthalmic division of the fifth cranial nerve; *Vb*, foramen for the main branch of the fifth cranial nerve; *VI*, foramen for the sixth cranial nerve; *VIIa*, foramen for the ophthalmic division of the seventh cranial nerve; *VIIb*, foramen for the main branch of the seventh cranial nerve; *IX*, *X*, foramen for the ninth and tenth cranial nerves; *XI*, foramen for the occipito-spinal nerve.

and forms the front wall of the auditory capsule and the posterior boundary of the orbit in front. It articulates with the prootic behind, with the pterotic, the parietal and the frontal above and with the ali-sphenoid below. It consists of two portions: (1) the body of the sphenotic and (2) the Y-shaped anterior process. The body of the sphenotic is roughly triangular in outline and bears two conical pits, one of which has a spongy base and forms a portion of the anterior wall of the auditory capsule while the other abuts on the cranial cavity. The Y-shaped anterior process lies horizontally; its basal limb articulates in front with the outer projecting point of the frontal; the upper limb is slender but the lower limb is thick and bears a shallow groove which is continuous with a similar groove on the pterotic, the two together forming the *hyomandibular groove.*

All the four bones of the auditory capsule are replacing bones.

(*c*) *The Orbito-temporal Region.*—The *orbito-temporal region* includes (*á*) the *temporal* or *sphenoidal region* and (*b′*) the *orbits.*

(*á*) The *sphenoidal region* comprises: (α) the *parietal region,* including the *parietals,* the *ali-sphenoids,* and the posterior part of the *para-sphenoid,* and (β) the *frontal region,* including the *frontals,* the *orbito-sphenoids,* and the anterior part of the *para-sphenoid.* Besides these, there is another bone—the *supra-temporal*—which is situated at the latero-posterior angle of the skull in close relation with the upper end of the pectoral girdle and which should also be included in this region.

(α) THE PARIETAL REGION.

The *parietals* are a pair of large rectangular *dermal* bones suturally connected with each other in the mid-dorsal line. The anterior edge of each parietal is connected with the posterior edge of the frontal, while the lateral edge overlaps the mesial edge of the pterotic and the mesio-dorsal surface of the sphenotic. Posteriorly the two bones are connected with and partially overlap the supra-occipital and the epiotic bones. The posterior edge of each parietal bears a shallow groove for the attachment of muscles covering the posterior part of the skull. The ventral surfaces of the two bones form part of the roof of the cranial cavity.

The *ali-sphenoids* are a pair of irregular bones, each consisting of a horizontal *basal piece* and a *vertical process* arising from the dorsal surface of the basal piece. Looked at from the ventral surface, each basal piece presents a jagged surface, and the two basal pieces meeting in the middle line leave a V-shaped notch at both the anterior and the posterior ends. The notch at the posterior end is confluent with a vacuity left between the dorso-mesial ends of the two prootics thus forming the elongated oval *pituitary fossa.* Into the anterior notch fit the postero-mesial portions of the orbito-sphenoids, thus completing the cranial floor at this place. The posterior edge of each basal piece articulates with the prootic. The vertical longitudinal process of each ali-sphenoid forms the lateral wall of the cranial cavity in this region, while externally it forms the inner wall of the posterior part of the orbit. The vertical process articulates posteriorly with the sphenotic, dorsally with the ventral ridge-like outgrowth of the frontal and anteriorly with the orbito-sphenoid.

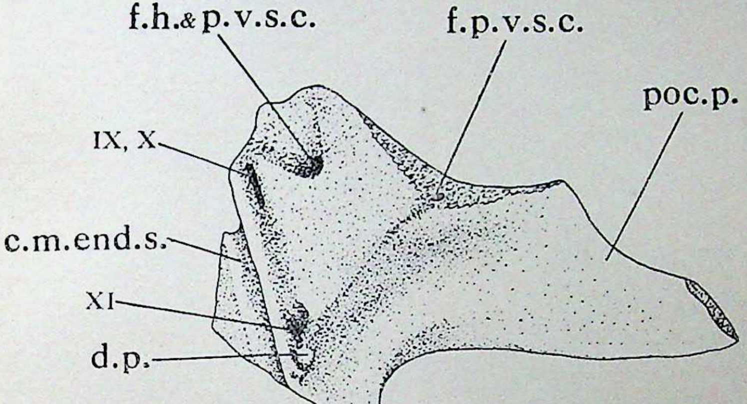

FIG. 17. External view of the right ex-occipital. (× *ca* $\frac{2}{3}$). *c.m.end.s.*, canal for median endolymphatic sinus ; *d.p.*, dorsal process of the bone ; *f.h.* and *p.v.s.c.*, foramen for horizontal and posterior vertical semi-circular canals ; *f.p.v.s.c.*, foramen for posterior vertical semi-circular canal ; *poc.p.*, par-occipital process ; *IX*, *X*, foramen for the ninth and tenth cranial nerves ; *XI*, foramen for the occipito-spinal nerve.

(β) THE FRONTAL REGION.

In front of the parietals, the roof of the skull is formed by the two large *frontals*, which occupy about one-half of the dorsal surface of the skull and are connected with each other by a median suture. The anterior margin of each frontal is slightly convex and articulates mesially with the posterior edge of the *mesethmoid*, and laterally with the *nasal* and the *ecto-ethmoid* of its own side. The lateral margin of each frontal bears a large triangular projection, thus forming a concave antero-lateral edge and similarly a concave postero-lateral edge. Along the antero-lateral edge articulates the *supra-orbital* ossification, while the postero-lateral edge articulates ventrally with the Y-shaped anterior process of the sphenotic and laterally with the *post-frontal* ossification and the anterior end of the *pterotic*. The posterior margin of the frontal is irregular in outline and articulates with the anterior edge of the parietal.

The ventral surface of each frontal presents two well-marked ridges ; one of them is a low ridge lying beneath the lateral triangular projection, along which the lateral process of the sphenotic articulates with the frontal; while the second is a high ridge about an inch in length which articulates with the vertical process of the ali- and orbito-sphenoids and with the ecto-ethmoid in front. The portion of the frontal internal to this high ridge forms the roof of the cranial cavity, while the portion of each frontal between the two ridges forms the roof of the orbit.

The *orbito-sphenoid* forms the floor as well as the middle portion of the inner wall of the orbit and lies in front of the ali-sphenoid. Like the ali-sphenoid, it consists of a horizontal *basal piece* and a *vertical longitudinal process*, the inner edges of the two basal pieces meeting in the mid-ventral line. Ventrally each basal piece presents a broken surface but dorsally it is smooth and forms partly the floor of the orbit and partly the floor of the cranial cavity—the two parts being separated by the vertical longitudinal process. The anterior edge of the orbito-sphenoid articulates with the postero-mesial edge of the ecto-ethmoid while the posterior edge articulates with the ali-sphenoid.

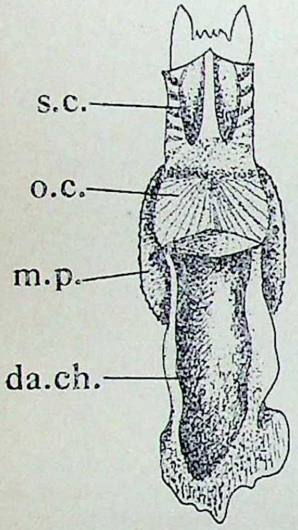

FIG. 18. Dorsal view of the basi-occipital. (× *ca* $\frac{3}{4}$). *da.ch.*, channel lodging the dorsal aorta; *m.p.*, masticating process of basi-occipital; *o.c.*, occipital condyle; *s.c.*, saccular canal.

The *para-sphenoid*[1] is a very long cross-shaped bone which covers a large part of the ventral surface of the cranium. It extends from the hind end of the basi-occipital bone right up to the vomer in front and consists of a long, thin, splint-like body, with a cross-piece or a lateral process on either side. The lateral processes are flat and wing-like and lie about the middle of the bone just beneath the ventral surfaces of the ali-sphenoids. Immediately in front of the cross-piece, the bone becomes narrow but widens gradually, becoming flatter and thinner towards its anterior end, the extreme anterior end being lancet-shaped. Between and behind the lateral processes, the bone is broad and strongly convex on its ventral surface and concave on its dorsal surface. Looked at from the ventral side, the middle portion of the bone is the highest, the bone sloping down from this point both forwards and backwards. In front of the lateral processes, there is a well-marked median vertical ridge running forwards towards the anterior end; the ridge is bounded on each side by a small spine-like process at its base. On the dorsal surface of the posterior portion, there is a median longitudinal channel which gradually disappears posteriorly but extends anteriorly on to the dorsal surface of the lateral processes and forms the floor of the *myodome* or the *eye-muscle-canal*. The lateral margins of the bone articulate on either side with the prootic behind, the ali-sphenoids and the orbito-sphenoids in the middle and the ecto-ethmoids in front. The cross-piece overlaps the ventral surfaces of the ali-sphenoids but does not lie quite flat on them so that a wide space is left between the two, which forms the anterior part of the *eye-muscle-canal* or the *myodome*.

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[1] The basi-sphenoid of the other Teleostei is absent in *Labeo* as a separate ossification, but it is possible that it may have fused with the para-sphenoid.

Of the bones of the sphenoidal region the ali- and the orbito-sphenoids are replacing bones, while the parietals, frontals and the para-sphenoid are all investing (dermal) bones.

The *myodome* is a name applied to 'a space developed in the orbito-temporal and otic regions of Teleostomes for the accommodation of the lengthened recti muscles of the eye'. In *Rohu*, the myodome in the dry skull is a large median space lying between the floor of the cranial cavity above and the para-sphenoid below. It is bounded posteriorly by the prootic and the basi-occipital, dorsally by the ali-sphenoid, ventrally by the para-sphenoid and anteriorly by the orbito-sphenoid. It opens anteriorly into the orbit by a large oval aperture through which the recti muscles pass behind to be inserted on to the walls of the myodome. The myodome is supposed to have originated by the penetration into the enlarged opening for the pituitary vein of recti muscles originally inserted on the outer surface of the orbital wall.[1]

(*b'*) *The Orbits*.—As already mentioned, the two *orbits* lie anteriorly on the ventro-lateral aspects of the skull. Each is bounded dorsally by the frontal, ventrally by the basal plates of the ali- and orbito-sphenoids, anteriorly by the ecto-ethmoid, posteriorly by the sphenotic and part of the ali-sphenoid and mesially by the vertical processes of the ali- and orbito-sphenoids. Besides these bones, five small *orbital bones* are developed in connection with the orbit, which together form the so-called '*orbital ring*'. Of these, the *supra-orbital* and the *post-frontal* surround the orbit dorsally, the *pre-orbital* forms the anterior boundary, the *infra-orbital* lies at the antero-ventral border while the *post-orbital* forms the postero-ventral border.

The *supra-orbital* is a small flat quadrangular bone, the anterior edge of which is connected with the ecto-ethmoid by means of connective tissue while its mesial edge articulates with and slightly overlaps the antero-lateral border of the frontal. Its posterior edge is narrower than the anterior and is joined by means of connective tissue with the anterior edge of the post-frontal. The dorsal surface is more or less convex whereas the ventral surface is concave.

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[1] Goodrich, E. S.—*Studies on the Structure and Development of Vertebrates*, p. 279 (London: 1930).

The *post-frontal* which forms the posterior part of the dorsal boundary of the orbit is more or less triangular in shape; the apex of the triangle lies away from the margin of the orbit and articulates with the anterior edge of the pterotic while the base of the triangle which is the smallest of the three sides articulates with the post-orbital. The inner side articulates with the postero-lateral edge of the frontal, whereas its outer side is connected with the opercular bone.

Ventro-laterally the orbit is bounded by a chain of three bones of which the most ventral is the *infra-orbital* with the *pre-orbital* in front and the *post-orbital* behind. The *pre-orbital* is an elongated slightly curved bone which articulates anteriorly with the *lacrymal*[1] and posteriorly with the infra-orbital. The *infra-orbital* is a narrow sickle-shaped bone forming the ventral boundary of the orbital ring and interposed between the pre-orbital in front and post-orbital behind. The *post-orbital* is an elongated bone which articulates behind with the post-frontal.

All the bones of the orbital ring are investing (dermal) bones.

It will be seen that each orbit is separated from the cranial cavity by a bony wall formed chiefly of the vertical processes of the orbito- and ali-sphenoids and that the cranial cavity extends between the two orbits right up to the ethmoidal region. Such a skull, in which there is no median vertical inter-orbital septum and the brain extends between the two orbits right up to the ethmoidal region, is termed *platybasic*.[2]

(*d*) *The ethmoidal Region.*—The *ethmoidal region* includes the bones developed in relation to the snout and the nostrils, specially the enclosure of the paired nasal sacs. These are the paired

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[1] According to various writers, the *lacrymal* forms the first of the series of bones which surround the orbit forming the so-called orbital ring; but in *Labeo* the lacrymal lies anterior to the orbital ring of bones being quite cut off from the latter. It is connected with the olfactory capsule and forms the anterior boundary of the nasal opening. Hence the bone has been considered in connection with the ethmoidal region rather than with the orbito-sphenoidal region. According to the position of the bones forming the orbital ring in *Labeo*, the supra-orbital is the first of the series.

[2] According to the absence or presence of the *inter-orbital septum*, the skulls are distinguished as *platybasic* and *tropibasic*. In the former case, the inter-orbital septum is absent and the brain extends up to the anterior extremity, e.g. in *Labeo*, *Frog*, etc. In the *tropibasic* type of skull, the orbits are separated only by an inter-orbital septum and the cranial cavity does not extend between them, the brain remaining behind the posterior margin of the orbital region, e.g. in *Chimaera*.

nasals, *ecto-ethmoids* and *lacrymals*, and a median *mesethmoid*, a *vomer* and a *rostral*.

Lying immediately in front of the frontal bones is a transversely elongated bone—the median *mesethmoid*—which separates the olfactory capsules of the two sides from one another. It consists of a central body with two lateral flat wing-like processes with rounded margins. The anterior border of the bone presents a median concave notch bounded on each side by a small pointed horn-like process. The median *rostral* bone fits into this concave notch. There is another deeper concavity on either side of the median notch. The dorsal surface of the bone has a smooth and polished appearance but its posterior border is rough in appearance and is covered over by the large frontals. Ventrally the bone bears a deep depression with thick lateral borders: in an entire skull this depression is covered over by the vomer. Posteriorly, the mesethmoid splits into a dorsal and a ventral plate, the two forming an angle of about 45° with each other and enclosing between them a median space which forms the extreme anterior end of the cranial cavity, filled in a fresh fish with a semi-solid fatty substance. The postero-lateral sides of both the dorsal and ventral plates articulate with the corresponding anterior edges of the ecto-ethmoids. Dorsally, at the postero-lateral angles of the mesethmoid lie the small *nasals*, while the *lacrymals* are situated along its antero-lateral borders. The lancet-shaped anterior end of the para-sphenoid is wedged in between the posterior borders of the vomer and the mesethmoid on the ventral surface of the skull. The lateral wings of the mesethmoid are free and each overhangs the nasal pit of its own side.

The *nasal* is a very small reniform bone, which lies above the olfactory capsule, on either side, in the notch formed at the postero-lateral corner of the mesethmoid with the adjoining corner of the frontal. Along with the lateral wing of the mesethmoid, the nasal forms the roof of the *nasal pit* and the dorsal border of the two nasal apertures or the nostrils.

Lying behind on each side of the mesethmoid is the *ecto-ethmoid* which forms the *olfactory capsule*. Each ecto-ethmoid consists of two portions; a mesial *body* covered over dorsally by the antero-lateral portion of the frontal and a *lateral process*. The main body of the bone is excavated by a deep pit—the so-called *nasal pit*—which lodges the nasal sac, and opens to the exterior by the double *nasal opening* which is completely surrounded by bone and is situated on the outer dorso-lateral surface of the ecto-ethmoid. On its posterior side, the bone presents a concave surface which forms the anterior boundary of the orbit. A small process from the ventro-mesial border of each ecto-ethmoid meets a similar process from the ecto-ethmoid of the other side in the middle line and these two median processes of the two bones are covered over ventrally by the anterior portion of the para-sphenoid. Antero-ventrally, each ecto-ethmoid articulates with the postero-lateral edge of the mesethmoid and postero-laterally with the anterior surface of the orbito-sphenoid. The outer *lateral process* of each bone articulates with the lacrymal in front and the pre-orbital behind. Posteriorly, it is connected with the anterior surface of the supra-orbital by means of stout ligaments. The dorsal surface of the lateral process forms a part of the floor of the nasal pit.

The *lacrymal* is a small elliptical bone lying alongside the antero-lateral border of the lateral wing of the mesethmoid right in front of the nasal openings. Its anterior edge is convex while the posterior edge is more or less straight. The anterior end of the bone is attached by means of connective tissue to the maxillary bone; at its inner border it articulates with the antero-lateral border of the mesethmoid; while the posterior end articulates with the lateral process of the ecto-ethmoid and the pre-orbital.

The *rostral* is a small flat bony piece with a short process extending downwards from its ventral surface. It lies in the median dorsal line just in front of the mesethmoid, between and behind the paired maxillæ. It is connected laterally and in front with the maxilla and behind with the mesethmoid by means of fibrous tissue. It is a specialized portion of the *ethmoid cartilage.*

The *vomer* is a thin quadrangular bone, lying on the ventral surface of the skull immediately in front of the para-sphenoid and beneath the mesethmoid. It forms the floor of the cavity roofed over dorsally by the mesethmoid. The anterior border of the bone is concave in outline and bears at each corner a thick condylar process, behind which there is a pad-like thickening articulating with the palatine of each side. The posterior edge is convex and bears a notch in the middle. Laterally the vomer articulates with the palatine and the antero-lateral edge of the ecto-ethmoid while posteriorly it overlaps the anterior border of the para-sphenoid.

Of the bones of the ethmoidal region, the mesethmoid, the ecto-ethmoids and the rostral are replacing bones, while the nasals, lacrymals and the vomer are all investing (dermal) bones.

(*e*) *Foramina for the emergence of the Cranial Nerves.*—The ten cranial nerves come out of the cranial cavity through the following foramina: (1) The *olfactory foramen* is a large rounded aperture at the bottom of the olfactory capsule on each side, through which the long olfactory nerve emerges out of the cranial cavity to supply its branches to the mucous membrane of the olfactory chamber. Immediately outside the olfactory foramen lies the anterior opening of the orbito-nasal canal (*vide infra*).

(2) The *optic foramen* is a very large oval aperture—almost a

large fissure—bounded dorsally by the ali-sphenoid, anteriorly by the orbito-sphenoid and ventrally by the para-sphenoid. The optic nerve of each side comes out through this large aperture while the recti muscles of the eye-ball enter the myodome through it. The two nerves cross each other beneath the ventral surface of the brain, and passing over to the opposite side, each leaves the cranial cavity through the optic foramen.

(3) The *foramen for the oculo-motor nerve* is a small elongated slit-like aperture on the floor of the myodome, situated about a quarter of an inch behind the optic foramen on each side. Through it the oculo-motor nerve enters the orbit from the cranial cavity.

(4) The *foramen for the pathetic nerve* is a very narrow elongated foramen towards the lower end of the ali-sphenoid above the optic foramen and beneath the foramen for the ophthalmic division of the trigeminal nerve. Through it the pathetic nerve enters the orbit from the cranial cavity.

(5) The *foramen for the ophthalmic division of the trigeminal nerve* is a fairly large foramen, more or less triangular in outline, lying at the posterior angle of the orbit at the junction of the vertical and the horizontal portions of the alisphenoid above the foramen for the pathetic nerve, below and a little behind the foramen for the ophthalmic division of the facial. Through it the ophthalmic division of the fifth nerve enters the orbit from the cranial cavity. In the orbit, this nerve runs forwards and upwards and reaching the anterior end of the orbit passes through the orbito-nasal canal, crosses the olfactory sac and continues its course forwards to divide into branches, which innervate the skin of the dorsal surface of the snout.

(6) The *foramen for the main division of the trigeminal nerve* is a large opening that perforates the anterior end of the prootic and lies immediately behind the large optic foramen. Through it the main portion of the trigeminal consisting of the maxillary and the mandibular branches leaves the cranial cavity. This foramen also transmits the buccal branch of the seventh nerve.

(7) The *foramen for the abducens* is a small foramen on the floor of the myodome, in between the oculo-motor foramen and the foramen for the trigeminal. It is easily seen as a rounded aperture on the ventral surface of the skull immediately outside the oculo-motor foramen. Through it the abducens nerve enters the orbit from the cranial cavity.

(8) The *foramen for the ophthalmic division of the facial* is a small rounded aperture on the inner wall of the orbit, in front of and above that of the ophthalmic division of the fifth. Through it the ophthalmic division of the facial nerve enters the orbit from the cranial cavity. In the orbit it runs forwards and upwards alongside and immediately above the ophthalmic division of the fifth and leaves the orbit along with the latter to innervate the anterior end of the snout.

(9) The *foramen for the main division of the facial* is a small slit-like foramen just behind and below the foramen for the maxillary and the mandibular divisions of the trigeminal. It pierces the prootic and through it the main trunk of the facial nerve leaves the cranial cavity.

(10) The *foramen for the glosso-pharyngeal and the vagus nerves* is a large elongated fissure-like aperture on the ventral surface in the posterior region of the skull. It perforates the ex-occipital bone just behind the prootic. It transmits the glosso-pharyngeal and the vagus nerves.

(11) The *foramina for the occipito-spinal nerves* are a pair of small foramina on either side in the auditory capsule. The first or the anterior one pierces the posterior wing-like portion of the ex-occipital behind the foramen for the ninth and tenth nerves and ventral to the ridge lodging the horizontal semi-circular canal. It transmits the anterior division of the occipito-spinal nerve. The second or the posterior one pierces the ventro-mesial edge of the ex-occipital bone and transmits the posterior division of the occipito-spinal nerve.

(*f*) *Other important apertures in the skull.*—In addition to the nerve-foramina described above, the following apertures may also be noted: (1) The *orbito-nasal canal* perforates the ecto-ethmoid bone for about a quarter of an inch opening anteriorly into the olfactory capsule and posteriorly into the orbit. It serves as a passage for one of the veins in the anterior region of the head.

(2) About a quarter of an inch behind and a little above the foramen for the trigeminal nerve is a *vacuity* in the pro-otic bone through which the anterior vertical and the horizontal semi-circular canals leave the cranial cavity and pierce the various bones which they traverse (cf. the account of the otic region). This vacuity is seen on the inner cranial wall in a median section of the skull.

(3) Just dorsal to the foramen for the glosso-pharyngeal and the vagus nerves is a *vacuity* which leads behind into the channels lodging the posterior vertical and the horizontal semi-circular canals. This vacuity also can be seen in a median section of the skull.

(4) The *fenestrae* are a pair of large oval openings at the posterior end of the skull enclosed by the epi-otic and the supra-occipital dorsally and by the ex-occipital laterally and ventrally. It is covered over during life by a thick membrane.

(5) The *foramen magnum* is a large triangular median opening at the hind end of the skull completely enclosed by the ex-occipitals. Through it the spinal cord enters the skull to be continued into the medulla of the brain.

(6) The *atrial apertures* are a pair of small openings on the floor of the cranium, one on either side of the median line, just behind the foramen magnum at the posterior end of the skull.

These are enclosed by the ex-occipital dorsally and the basi-occipital ventrally. These apertures lead into a median canal—the atrium—which lodges the sinus endolymphaticus of the internal ear.

(7) The *channel lodging the dorsal aorta* is a big drain-like channel excavating the basi-occipital. Through it the dorsal aorta passes forwards to lie on the ventral surface of the skull.

(2) The Visceral Skeleton.

The *visceral skeleton* (figs. 19–24) originally consists of a series of seven half-hoops which are derived from the splanchnic mesoblast and primarily lie in the pharyngeal wall encircling the buccal and pharyngeal cavities. The corresponding right and left half-hoops unite with one another in the mid-ventral line, forming seven *visceral arches*. Again, the successive visceral arches unite with one another in the mid-ventral line, thus giving rise to a basket-like *visceral skeleton*. The first of these

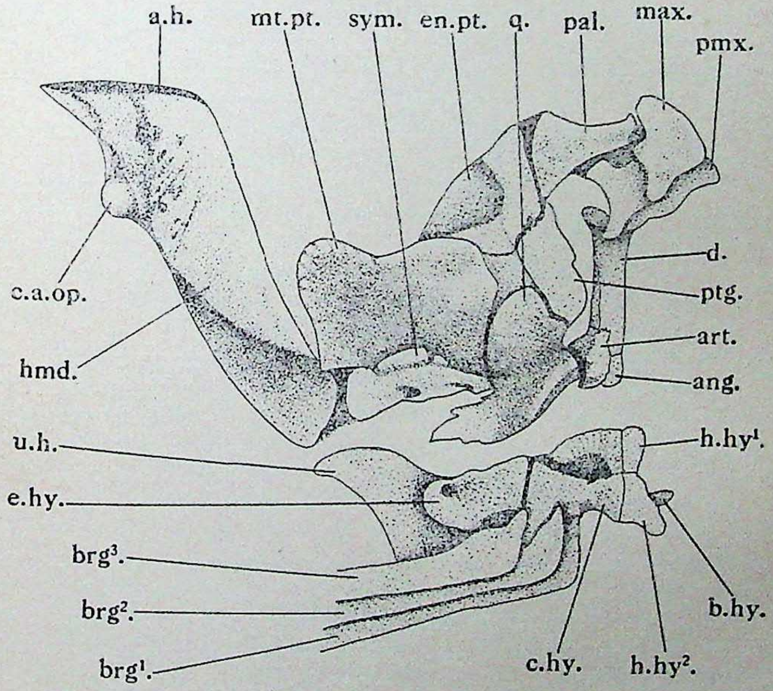

Fig. 19. Outer view of the right jaws and hyoid arch. (× *ca* Nat. size). *a.h.*, articulating head of hyomandibular; *ang.*, angular; *art.*, articular; *b.hy.*, basi-hyal; *brg.*$^{1-3}$, first, second, and third branchiostegal ray; *c.a.op.*, condyle for articulation with opercular bone; *c.hy.*, cerato-hyal; *d.*, dentary; *e.hy.*, epi-hyal; *en.pt.*, endo-pterygoid; *h.hy.*$^{1-2}$, first and second hypo-hyals; *hmd.*, hyomandibular; *max.*, maxilla; *mt.pt.*, meta-pterygoid; *pal.*, palatine; *pmx.*, pre-maxilla; *ptg.*, ecto-pterygoid; *q.*, quadrate; *sym.*, symplectic; *u.h.*, uro-hyal.

arches—the *mandibular arch*—lies immediately behind the mouth and gives rise to the upper and lower jaws which are closely connected with the cranium. The second or the *hyoid arch* forms the suspensorium by means of which the two jaws are suspended from the lateral surfaces of the auditory capsules. Of the next five arches known as the *branchial arches*, four support the gills while the fifth forms the *inferior pharyngeal bones*, which develop into powerful masticating plates armed with large teeth biting against the horny pad borne on the ventral process of the basi-occipital.

In the adult *Rohu*, the visceral arches are completely ossified, being composed of both replacing and investing bones.

(*a*) *The mandibular arch.*—The *mandibular arch* is highly developed, consisting of a 'primary' *endoskeletal* part and a 'secondary' *dermal* part. Each half of this arch is divided into a dorsal *palato-pterygo-quadrate* bar which enters into close relation with the cranium and forms the primary upper jaw, and a ventral *Meckel's cartilage*, which forms the primary lower jaw. The primary upper jaw is ossified by three replacing bones—the *palatine*, the *meta-pterygoid* and the *quadrate* while it is covered over by two dermal bones—the *ecto-pterygoid* (pterygoid) and the *endo-pterygoid* (meso-pterygoid). These bones do not, however, enter into the gape of the mouth and do not therefore constitute the upper jaw proper of the adult fish. Two large investing bones—the *pre-maxilla* and the *maxilla*—on each side support the anterior margin of the mouth and together form the secondary upper jaw; but the pre-maxilla alone bounds the mouth, the maxilla being shut off altogether from the gape.

Each half of the primary lower jaw or Meckel's cartilage is ossified by a single small bone, the *articular*,[1] which continues forwards into a narrow pointed rod of cartilage, representing the original meckel's cartilage. Two other bones, a large *dentary* and a small *angular* complete the adult lower jaw. The dentaries of the two sides meet in the middle line and support the posterior margin of the mouth.

The *five* elements of the upper jaw form a compact series of bones attached directly by means of the palatine to the ethmoid region of the cranium, and indirectly through the intervention of the hyomandibular and the symplectic to the auditory region of the skull.

The *palatine* is an elongated bone, expanded at both ends but narrow in the middle. Its inner edge is more or less straight while the outer edge presents a deep concavity. The ventral surface presents a shallow groove, while the dorsal surface bears a short blunt process whereby it articulates with the ventral surface of the mesethmoid. Anteriorly it articulates with the posterior edge of the maxilla, the articular surface being thickened and rounded ; it is also attached to the posterior process of the maxilla by means of connective tissue along its external border. Posteriorly, it articulates both with the ecto-pterygoid and the endo-pterygoid while mesially it is bound to the ventral surface of the vomer through fibrous tissue.

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[1] All the three bones of the lower jaw are of compound origin, partly endo-chondral and partly dermal (cf. p. 332).

The *ecto-pterygoid* (pterygoid) is a triangular thin plate-like bone which lies immediately behind the palatine. Its anterior border is free and presents a deep notch. Along its ventral border, it articulates with the quadrate while along its postero-dorsal border, it articulates with the endo- and meta-pterygoids. Externally the bone is partially covered over by the quadrate.

The *endo-pterygoid* (meso-pterygoid) is a thin rhomboidal bone lying behind the palatine and dorsal to the ecto- and meta-pterygoids. Its ventral surface is depressed while the external surface is convex and is partly covered over by the meta-pterygoid. It is firmly attached to the palatine along its anterior border, the inner border is free, while the posterior border articulates with the meta-pterygoid and the outer border with the ecto-pterygoid. The inner concave surface of the endo-pterygoid presents a number of vacuities.

The *meta-pterygoid* is a large flat bone, more or less quadrangular in outline, which lies behind the ecto- and endo-pterygoids, between them and the hyomandibular. Anteriorly it articulates with the endo- and ecto-pterygoids and the quadrate, ventrally it articulates with the symplectic and posteriorly with the hyomandibular. The inner surface of the bone presents a shallow depression, continuous anteriorly with a similar depression on the inner surface of the endo-pterygoid.

Articulating with the lower edge of the ecto-pterygoid is a large more or less triangular bone, the *quadrate*, which carries a ventral condylar process for the articulation of the lower jaw. Close to the ventral border of the quadrate runs a well-defined ridge directed obliquely backwards from the condyle. The posterior portion of the bone overlaps the anterior portion of the pre-opercular bone and has a jagged posterior border. On the inner surface close to the ventral border there is an elongated depression into which fits the anterior end of the symplectic. The dorsal portion of the quadrate partially covers the ecto-pterygoid and articulates posteriorly with the meta-pterygoid and the symplectic.

The *pre-maxilla* is a thick curved bone which meets its fellow of the opposite side in the middle line and forms the anteriormost bone of the skull. Its anterior edge is concave while the posterior edge is convex. The two pre-maxillæ are joined together in the middle line by means of connective tissue. Its free outer end together with the outer end of the maxilla forms an articulating surface for the dentary. The inner surface of the bone is highly concave ; but the outer surface is highly convex and is partly overlapped by the maxilla with which it is firmly connected. The pre-maxilla is freely movable during life.

The *maxilla* is a thick curved bone of irregular shape lying dorsal and parallel to the pre-maxilla. It partially overlaps the pre-maxilla and is produced into two processes one directed outwards and downwards, the other directed inwards and downwards; the former along with the lateral edge of the pre-maxilla is bound by means of stout ligaments to the dorsal edge of the dentary while the other process is bound to the anterior border of the palatine by stout ligaments. The inner surface of the bone is deeply concave and closely fits on the outer surface of the pre-maxilla. Along its posterior border, the bone slightly overlaps and is bound to the dorsal surface of the vomer. The mesial edges of the two maxillæ do not meet in the middle line but are connected with each other by strong connective tissue. Posteriorly a small space is left between the maxillæ of the two sides, wherein fits the median rostral bone of the ethmoidal region. Dorso-laterally the maxilla articulates with the lacrymal.

The maxillæ, the pre-maxillæ and the rostral are strongly bound together by fibrous tissue; these five elements thus form a compact structure which acts as one piece, little movement being possible between its separate parts. This piece forms the upper jaw of the fish and is capable of a certain amount of movement upon the anterior end of the cranium to which it is attached, not only by general fibrous tissue, but also, on each side of the head, by the ethmoido-maxillary ligament which extends from the dorso-lateral process of the ecto-ethmoid to the maxilla, passing beneath the lacrymal. The upper jaw bones are also firmly connected with the dorso-lateral border of the mandible by means of stout ligaments, whereby they are pulled downwards and forwards when the mouth is opened. These ligaments also tend to pull them back in place when the mouth is closed, but, in addition to this indirect action, the adductor mandibulæ muscle acts directly upon the bones through a long tendon that arises from the lower anterior end of the muscle and is inserted on to the external surface of the maxilla.[1]

The primary lower jaw, as already stated, is partly replaced by bone and partly covered by dermal ossifications. Three bones—a small *articular*, a large *dentary* and a small *angular* together form the adult lower jaw. The articular is made up of an endo-chondral articular fused with an outer dermal element called the ‘derm-articular’. Similarly, the angular also develops from an endo-chondral and a dermal element. The dentary is also of compound origin, being formed of a true dermal dentary and a small anterior endo-chondral element probably representing the mento-meckelian (Goodrich, p. 303).

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[1] Allis, E. P.—Skull and Cranial Muscles, etc. in Scomber. J. Morph., v. 18, 1903.

The *articular* is a small elongated vertically placed bone consisting of a thick proximal end and a thin splint-like anterior part. The thick posterior end presents an articulating facet for articulation with the quadrate. The splint-like anterior part fits into a groove on the upper surface of the dentary and is continued upwards into a narrow pointed rod of cartilage which is the remnant of the original meckel's cartilage.

The *dentary* is a large bone, hammer-shaped in appearance, which meets its fellow of the opposite side in the median line and is bound with it by means of connective tissue. The long axis of the hammer, which lies in a vertical position, presents a groove on its inner surface, into which fit the splint-like portion of the articular and the meckel's cartilage. At its lower end, it articulates with the angular and at its dorso-lateral corner it is bound to the maxilla and the pre-maxilla. The upper end of the dentary is expanded horizontally and with its fellow of the opposite side forms the lower jaw proper which supports a thick horny pad during life.

The *angular* is a small, thick, irregular piece of bone that lies at the angle of the jaw and covers ventrally the lower end of the dentary with which it is suturally connected. Posteriorly

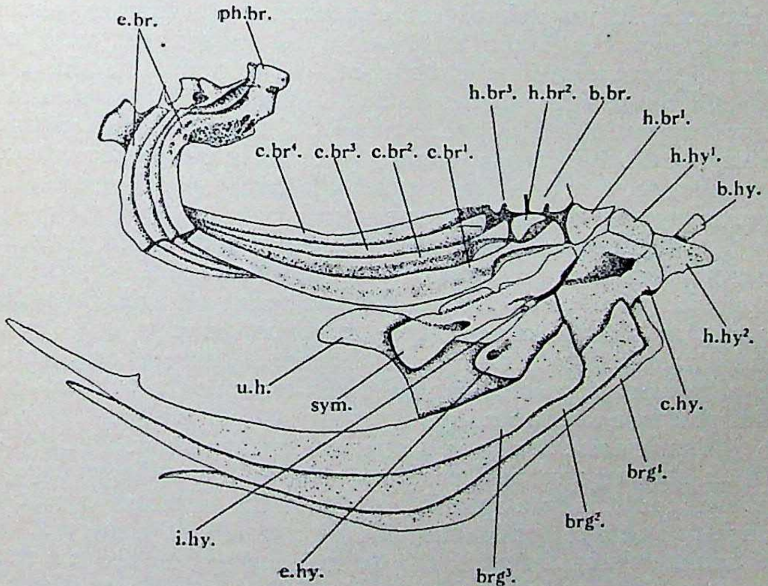

FIG. 20. The hyobranchial skeleton seen from the right side. ($\times$ *ca* $1\frac{1}{5}$). *b. br.*, basi-branchial ; *b.hy.*, basi-hyal ; *brg.*$^{1-3}$, first, second, and third branchiostegal ray ; *c.br.*$^{1-4}$, first, second, third, and fourth cerato-branchial ; *c.hy.*, cerato-hyal ; *e.br.*, epi-branchial ; *e.hy.*, epi-hyal ; *h.br.*$^{1-3}$, first, second, and third hypo-branchial ; *h.hy.*$^{1-2}$, first and second hypo-hyal ; *i.hy.*, inter-hyal ; *ph.br.*, pharyngo-branchial ; *sym.*, symplectic ; *u.h.*, uro-hyal.

the angular is connected by means of ligaments with the anterior end of the inter-opercular bone.

None of the bones of the two jaws bear teeth.

(*b*) *The Hyoid arch.*—The *hyoid arch*, like the mandibular, consists originally of two half-hoops of cartilage which are connected in the mid-ventral line through a median ventral piece, the basi-hyal. Each hyoid bar becomes divided into two parts: the dorsal *hyomandibula* and the ventral *hyoid cornu*, which latter is again divisible from above downwards into segments called respectively *epi-hyal*, *cerato-hyal*, and *hypo-hyal*. To these is added a ventral median copula, the *basi-hyal*. The large hyomandibular cartilage ossifies in two pieces—a *hyomandibular bone* above, articulating with the auditory capsule, and a *symplectic* below connected with the quadrate. These two bones form the *suspensorium* by means of which the two jaws are suspended to the skull proper. The remaining ventral elements of the hyoid arch ossify into three bones—the *epi-hyal*, the *cerato-hyal* and a double *hypo-hyal*. The copula or the *basi-hyal* connects the hypo-hyals of the two sides. A small separate segment the *stylo-hyal* or *inter-hyal* lies between the symplectic of the dorsal hyomandibula cartilage and the epi-hyal of the ventral hyoid cornu (it has sometimes been compared to the epi-branchial, but probably is a new formation). All these ventral elements of the hyoid arch are closely associated with the branchial arches, forming the so-called *hyobranchial skeleton*.[1]

Of the next five arches known as the *branchial arches*, the four support the gills while the fifth known as the *inferior pharyngeal bones* form a powerful masticating plate armed with powerful teeth which bite against the horny pad borne on the ventral process of the basi-occipital.

Connected with the hyoid arch are a number of investing bones which serve to support the operculum. These are the *opercular*, the *pre-opercular*, the *sub-opercular* and the *inter-opercular*. Three sabre-shaped *branchiostegal rays* (*branchiosts*) are attached along the ventral border of the epi- and cerato-hyals, while an unpaired bone, the *basi-branchiostegal* or *uro-hyal*, lies posterior to the basi-hyal.

The *hyomandibular* is a strong elongated bone, which lies in an obliquely vertical position between the auditory capsule above and the pre-opercular below. Its anterior border is slightly concave while the posterior is slightly convex. It articulates dorsally with the lateral surface of the auditory capsule, the broad facet for its articulation being formed by the

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[1] Except for its dorsal element, i.e. the *hyomandibular*, the hyoid arch is closely associated with the five branchial arches: hence the branchial arches together with the ventral portion of the hyoid arch should properly be designated the 'hyobranchial skeleton' (Goodrich, p. 440).

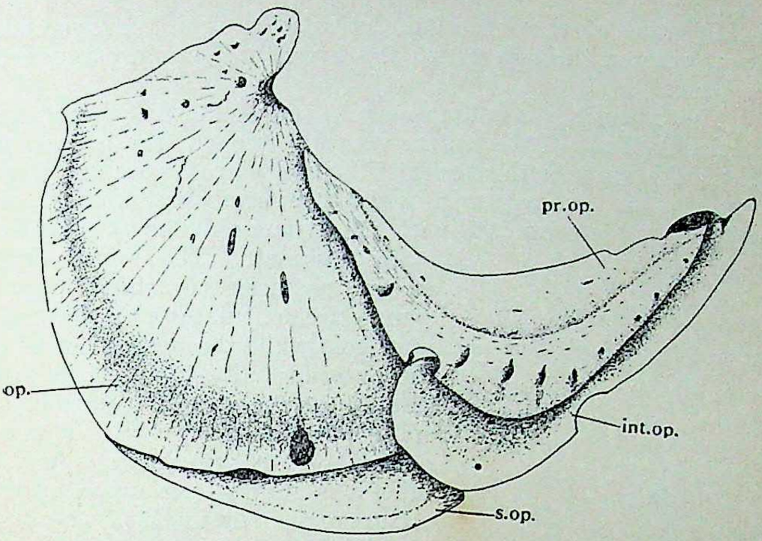

FIG. 21. External view of the operculum. (× *ca* 1⅕). *int.op.*, inter-opercular ; *op.*, opercular ; *pr.op.*, pre-opercular ; *s.op.*, sub-opercular.

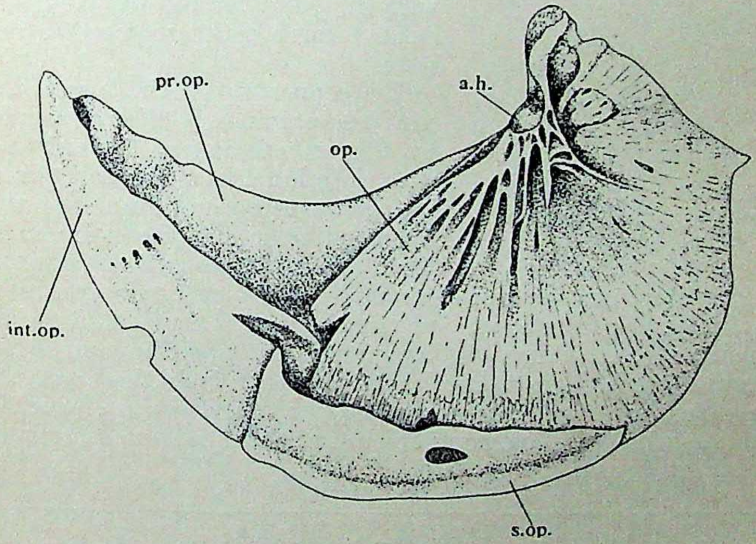

FIG. 22. Internal view of the operculum. (× *ca* 1⅕). *a.h.*, articulating facet for hyomandibular ; *int.op.*, inter-opercular ; *op.*, opercular ; *pr.op.*, pre-opercular ; *s.op.*, sub-opercular.

sphenotic, prootic and the pterotic. Ventrally it articulates with the posterior border of the meta-pterygoid and the pre-opercular. The posterior edge possesses a knob for articulation with the opercular bone. Externally, part of its ventral portion is covered over by the pre-opercular bone. On its inner surface just in front of the knob-like articulation with the opercular lies a foramen through which the hyomandibular nerve pierces the bone.

The *symplectic* is a long narrow bone lying in a horizontal position in front of the antero-ventral corner of the hyomandibular; the anterior third of it fits into a groove on the inner surface of the quadrate with which it is firmly articulated. Its posterior end is connected with the hyomandibular by means of stout ligaments. The dorsal border of the posterior two-thirds of the symplectic articulates with the meta-pterygoid while the ventral border of the anterior half of the bone articulates with the cerato-hyal and the epi-hyal. Externally only a small portion of the symplectic is visible since it is largely overlapped by the pre-opercular bone. Both the hyomandibular and the symplectic are firmly attached to the meta-pterygoid and the quadrate and together with the opercular and the pre-opercular form a rigid support for the jaws.

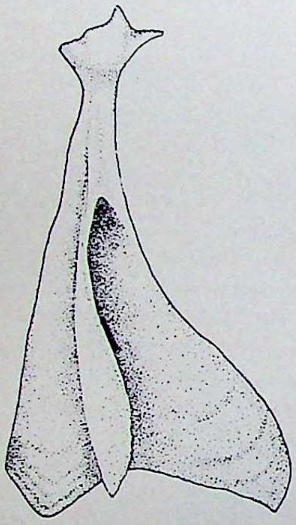

Fig. 23. Side view of the uro-hyal or basi-branchiostegal bone. (× *ca* ½).

The connection of the upper jaw with the cranium is effected partly by the articulation of the palatine with the ethmoidal region and partly by the suspensorium formed of the hyomandibular and the symplectic, the hyomandibular articulating with the auditory capsule and the symplectic fitting into a groove in the quadrate. The lower jaw, in its turn, is articulated to the quadrate bone. Thus the hyomandibular and the symplectic serve to suspend, so to speak, the two jaws from the cranium: they are, therefore, together called the *suspensorium*. Such a skull in which the hyomandibular serves as the suspensorium is known as *hyostylic*.[1]

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[1] In Dipnoi and possibly in Holocephali, the quadrate region is articulated directly to or fused with the auditory region of the skull without the intervention of the hyomandibular: this condition is described as *autostylic*. In the majority of Selachii and in all Teleostomi, the quadrate region is articulated with the skull through the intervention of the hyomandibular: this condition is known as *hyostylic*. In the more primitive Chondrichthyes (Notidani and early Heterodonti among Selachii, Pleuracanthodii, Acanthodii and Cladoselachii), the quadrate region is articulated directly to the skull through an otic process and is, at the same time, suspended by the hyomandibular: this condition is described as *amphistylic*.

Both the hyomandibular and the symplectic, forming the suspensorium are replacing bones.

(*c*) *The Hyobranchial Skeleton.*—The four elements of the hyoid cornu form a compact series of bones attached to the inner surface of the anterior end of the inter-opercular. The *epi-hyal* is more or less a triangular piece of bone suturally connected with the posterior end of the cerato-hyal. Ventrally and slightly externally its anterior end gives attachment to the third or posteriormost branchiostegal ray. The *cerato-hyal* is a flat piece of bone, lying just in front of the epi-hyal and articulating anteriorly with two small hypo-hyals. The first branchiostegal ray is attached internally while the second ray is attached externally along its ventral border. The *hypo-hyals* are two small pieces of bone, one of which (the dorsal) articulates with the antero-dorsal edge, the other (the ventral) with the antero-ventral edge of the cerato-hyal. The ventral hypo-hyal is connected with the corresponding hypo-hyal of the opposite side in the middle line. Interposed between the hypo-hyals of the two sides, is a small median bone—the *basi-hyal*—which is a small cylindrical bone dilated both at its anterior and posterior ends. It articulates posteriorly with the anterior end of the basi-branchiostegal bone or uro-hyal. Dorsal to and in between the epi-hyal and the symplectic is a small piece of bone, the *stylo-hyal* or *inter-hyal,* which is connected ventrally with the epi-hyal and externally with the pre-opercular bone.

Of the investing bones which support the operculum (figs. 21 and 22), the *opercular* is the largest and the most prominent. It has a slightly concave inner surface and a convex external surface. The anterior edge is partly overlapped by the pre-opercular and partly by the inter-opercular. The dorsal edge is firmly attached to the lateral edge of the pterotic through stout ligaments. The posterior border, which overlaps the supra-cleithrum of the pectoral girdle, forms a large curve and imperceptibly passes into the ventral border, which overlaps the sub-opercular bone, the two bones being firmly bound together. In the upper part of its anterior border, the opercular bone presents a facet for articulation with the hyomandibular. The inner surface of the upper part of the bone presents a shallow depression for the insertion of the connective tissue connecting the hyomandibular and the opercular bone.

In front of and partly overlapping the anterior border of the opercular bone is the large *pre-opercular*. It is a large crescent-shaped bone, with the hollow of the crescent directed upwards. Anteriorly it articulates with the quadrate and the symplectic and postero-dorsally with the hyomandibular and ventrally with the opercular and inter-opercular. Its upper triangular corner fits into a groove in the hyomandibular.

The *sub-opercular* is an elongated sabre-shaped bone which lies below and internal to the opercular. Anteriorly it articulates with and is slightly overlapped by the inter-opercular. The ventral border of the bone overlaps the hinder part of the posterior branchiostegal ray.

The *inter-opercular* is a long stout bone which lies all along the ventral border of the pre-opercular bone. Anteriorly it is bound by ligaments to the angular, dorsally it is overlapped by the pre-opercular bone, while posteriorly it overlaps the anterior end of the opercular and sub-opercular bones. Its ventral border is slightly curved, and forms the anterior half of the ventral edge of the gill-cover or operculum and overlaps the upper half of the posterior branchiostegal ray. Along its inner surface, the anterior end is covered over by the cerato- and epi-hyal bones which are firmly attached to it.

The *branchiostegal rays* are three long, curved, sabre-shaped bones, the anteriormost of which is the smallest and is attached along the lower edge of the cerato-hyal ; the second lies along the outer surface of the cerato-hyal partially overlapping the first branchiostegal ray, while the third ray, which is the longest of the series, is attached to the outer surface of the epi-hyal and partially overlaps the preceding ray. All the three rays are connected anteriorly with the ventral border of the inter-opercular bone by means of a membrane—the *branchiostegal membrane*.

The *basi-branchiostegal* or *uro-hyal* (figs. 19, 20 and 23) is an unpaired triradiate bone, lying posterior to the basi-hyal in between the epi-, cerato-, and hypo-hyals of the two sides and passing backwards between the sternohyoid muscles. It is generally considered to be an ossification of the median ligament[1] and is peculiar to the Teleostei. The two ventral wings of the bone lie adjacent to each other more or less in a horizontal plane while the third wing is placed in the middle line vertically at right angles to the first two. All the three wings attain their greatest width at their posterior ends and converge anteriorly, where the bone presents a triangular appearance. At its anterior end it articulates with the posterior end of the basi-hyal.

The Branchial arches.

The remaining five arches are known as the *branchial arches* (figs. 20 and 24), of which the first four support the pharyngeal wall and the gills while the fifth arch is reduced to a single bone on each side and is called the *inferior pharyngeal bone*. Each branchial arch on either side is typically ossified by four replacing bones : a dorsal *pharyngo-branchial*, a lateral *epi-branchial*, a large ventral *cerato-branchial* and a small *hypo-branchial*. The first three arches contain all the four segments, except, however, the third arch in which the hypo-branchial forms an unpaired median piece. In the fourth arch, the pharyngo-branchial is unossified, and the hypo-branchial is absent ; while the fifth arch consists of the paired inferior pharyngeal bones which represent the enlarged cerato-branchials of this arch. The right and left hypo-branchials are connected with a single unpaired *basi-branchial*, which is connected anteriorly with the basi-hyal. The hypo-branchials, the basi-branchial and the basi-hyal together form a median ventral plate in the floor of the pharynx.

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[1] Goodrich, E. S.—*Studies on the Structure and Development of Vertebrates*, p. 443 (London : 1930).

The *pharyngo-branchials* are small pieces of bone lying obliquely in the dorsal wall of the pharynx. Those of the first three arches are ossified while that of the fourth is unossified. The second and the third pharyngo-branchials are fused together. Dorsally they are connected with the prootic bone of the auditory region by means of ligaments, ventrally they are connected with the epi-branchials. The *epi-branchials* are curved elongated

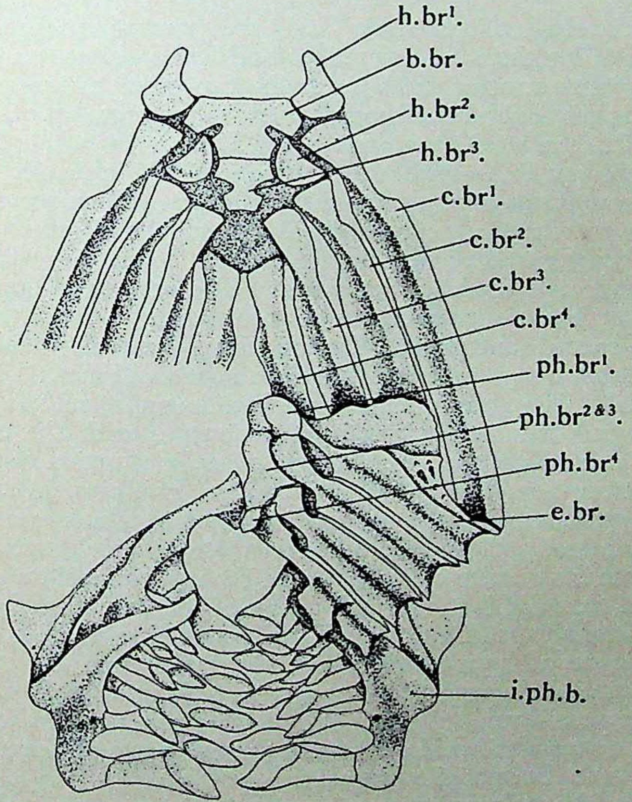

FIG. 24. Dorsal view of branchial arches. (× *ca* $1\frac{1}{3}$). *b.br.*, basi-branchial ; *c.br.*$^{1-4}$, first, second, third, and fourth cerato-branchial ; *e.br.*, epi-branchial ; *h.br.*$^{1-3}$, first, second, and third hypo-branchial ; *i.ph.b.*, inferior pharyngeal bone ; *p.br.*$^{1-4}$, first, second, third, and fourth pharyngo-branchial.

bones grooved along their posterior surfaces; they lie in an obliquely vertical position directed slightly backwards and outwards and articulate dorsally with the pharyngo-branchials and ventrally with the cerato-branchials. The pharyngo-branchials form the dorsal part of each arch, the epi-branchials the lateral part, whereas the cerato-branchials and the hypo-branchials form the ventral part. The junction of the dorsal and the ventral part of the arches is formed by a cartilaginous hinge-joint between the epi-branchials and the cerato-branchials. The *cerato-branchials* are elongated rod-like bones grooved along their ventral surfaces. They are directed forwards and inwards and form the greater part of the arches and support the ventro-lateral wall of the pharynx. Each of the first three cerato-branchials articulates anteriorly with its hypo-branchial, the fourth cerato-branchial, however, is bound by connective tissue to the cerato-branchial of the third arch.

Both the epi-branchials and the cerato-branchials are grooved along their outer surfaces and are V-shaped in cross-section. The arms of the V form the two edges of the groove, in which runs the branchial artery, while to the edges are attached the gill-filaments. At the apex of the V along the whole length of the epi-branchials and cerato-branchials are borne dorsally a double row of small processes—the *gill-rakers*—which serve as a sieve to prevent the escape of food through the gill-slits.

Anteriorly, the cerato-branchials are connected with the hypo-branchials of their own arches. The first hypo-branchial is more or less triangular in appearance, the apex of the triangle being directed anteriorly. It articulates ventrally with the antero-lateral edge of a small flattened median piece, the basi-branchial. The second hypo-branchial is more or less semi-circular in outline. Posteriorly it articulates with the cerato-branchial of the second arch, antero-mesially it articulates with the postero-lateral edge of the median basi-branchial. The third hypo-branchial is a flat median piece to which are bound postero-laterally the cerato-branchials of the third arch. Anteriorly it is suturally connected with the median basi-branchial. The *basi-branchial* is a median flat piece of bone, which articulates antero-laterally with the first hypo-branchial, postero-laterally with the second hypo-branchial and posteriorly with the median hypo-branchial of the third arch. Anteriorly it is connected with the basi-hyal. The hypo-branchials along with the basi-branchial and the basi-hyal form a ventral plate of bone which supports the floor of the pharynx.

The fifth arch consisting of a pair of *inferior pharyngeal bones* are highly modified and correspond to the cerato-branchials of other arches. Each is more or less triangular in shape and lies in an obliquely horizontal position immediately behind the fourth arch. The apex of the triangle is directed upwards and backwards and fits into the cup-like hollow of the auditory capsule, whereas the base is directed obliquely forwards and downwards. Of the remaining two sides of the triangle, one is directed postero-ventrally and is convex in outline, while the other is directed antero-dorsally and is highly concave. All the three apices of the triangle are produced into strong processes; one of which is directed forwards, the other directed ventrally, while the third points upwards. The anterior process of each bone meets the corresponding process of the bone of the opposite side in the middle line and is firmly bound to it by means of connective tissue. From the ventral process arise two thick muscles: the first muscle runs forwards and is attached to the outer surface of the cleithrum; its contraction pulls the bone forwards and downwards. The second muscle runs backwards and slightly inwards and upwards and is attached to the ventro-lateral surface of the centrum of the fused third and fourth vertebræ; its contraction pulls the bone backwards. From the postero-ventral side of the bone, arises a stout band of muscles which are attached to the inner surface of the hollow of the auditory capsule; its contraction pulls the bone upwards. The outer surface of the triangle is highly fenestrated while the inner surface bears large and strong teeth arranged in three rows. The first or the innermost row comprises five teeth, the second row comprises three while the third row comprises only two. These teeth work against the horny pad on the masticatory process of the basi-occipital. The contraction of the anterior muscle pulls the teeth away from the horny pad, thereby broadening the passage to the stomach; the contraction of the posterior and the dorsal muscles brings the teeth nearer the pad against which they bite. It may be noted, that this is the only bone in the skull of *Rohu*, which bears teeth.

II. The Appendicular Skeleton.

The pectoral and pelvic girdles together with the skeleton of the fins attached to them constitute the appendicular skeleton. The pectoral girdle lies immediately behind and beneath the last branchial arch, while the pelvic girdle lies in the abdominal region, a little distance in front of the anal fin.

(*A*) *The Pectoral Girdle.*

The *pectoral girdle* (fig. 25) consists of a 'primary' *endoskeletal* girdle which is more or less reduced and a 'secondary' *dermal* girdle which is much more highly developed than the primary girdle.

The primary girdle consists of two distinct lateral halves which do not meet in the middle line; each half is ossified into three replacing bones—a *scapula*, a *coracoid*, and a *meso-*

coracoid. The large secondary dermal girdle consists on each side of a large *cleithrum*, a *supra-cleithrum*, a *post-temporal* and a *post-cleithrum*, which are all investing bones. These dermal bones form the posterior boundary of the gill-chambers as well as places of support for the opercular bones which fit on to them. Further, the dermal girdle is connected on each side with the pterotic process in the posterior region of the skull by means of the post-temporal.

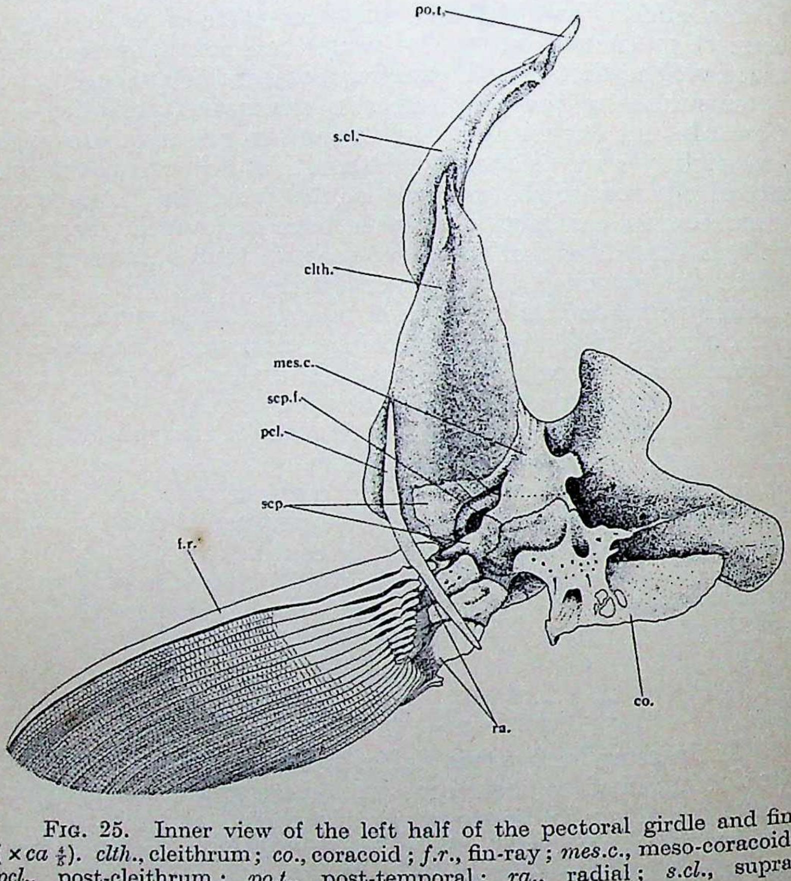

FIG. 25. Inner view of the left half of the pectoral girdle and fin. (× *ca* $\frac{4}{5}$). *clth.*, cleithrum; *co.*, coracoid; *f.r.*, fin-ray; *mes.c.*, meso-coracoid; *pcl.*, post-cleithrum; *po.t.*, post-temporal; *ra.*, radial; *s.cl.*, supra-cleithrum; *scp.*, scapula; *scp.f.*, scapular foramen.

The three elements of the primary shoulder girdle form a compact series of small bones attached to the postero-ventral surface of the cleithrum. The *scapula* is a ring-shaped bone lying laterally on the inner surface of the cleithrum; it is provided with two flattened outgrowths—a lateral and a mesial. The lateral outgrowth is closely applied to the inner surface of the cleithrum, whereas the mesial outgrowth articulates internally with the meso-coracoid and the coracoid and posteriorly with the first and second radials (*brachial ossicles*). The scapular region is hollowed out by a muscle-canal which is closed dorsally by a meso-coracoid arch and through which pass the dorso-medial muscles of the fin. Through the large foramen of the ring or the so-called *scapular foramen* pass the brachial artery and the brachial nerve. The *coracoid* is a large fenestrated bone, irregularly triangular in shape lying in an obliquely vertical position internal to the scapula and ventral to the meso-coracoid. The anterior ends of the two coracoids converge towards the mid-ventral line and articulate with a ridge borne on the anterior median processes of the cleithra, leaving a large elongated fissure on each side between the coracoid and the cleithrum. The posterior end of each coracoid articulates laterally with the scapula, dorsally with the meso-coracoid and posteriorly with the mesial outgrowth of the scapula and the second and third radials. The inner margin of the posterior third of the coracoid is suturally connected with the inner margin of a horizontal ridge given off from the inner surface of the cleithrum. The *meso-coracoid* is an inverted Y-shaped bone which lies closely attached to the inner surface of the cleithrum ; the inner limb of the Y articulates ventrally with the coracoid and with the mesial outgrowth of the scapula ; while the outer limb and the main shank of the Y are closely applied to the inner surface of the cleithrum, the outer limb also articulating ventrally with the external or the lateral scapular outgrowth. The scapula and the coracoid both share in the formation of the *glenoid articulation*, to which three of the four radials are movably articulated.

In the secondary pectoral girdle, the *cleithrum* or *clavicle* is the largest and the most prominent bone completely covering the primary girdle on the outside. It is crescent-shaped in appearance and consists of two distinct portions : a triangular posterior vertical portion and a large anterior obliquely horizontal portion, the two portions being separated from each other by a crescentic ridge. The obliquely horizontal portion forms the ventral and posterior boundary of the branchial chamber ; when the branchial chamber is closed, the posterior edge of the operculum fits against the crescentic ridge separating the two portions of the cleithrum. The anterior ventral end of the bone extends forwards beneath the gill-chamber and articulates firmly with the corresponding part of its fellow of the opposite side in the median line. The inner margin of the horizontal portion is produced into a broad and truncated flat process which is bound by means of connective tissue with the corresponding process of the other side. Just behind and above this process lies the fifth branchial arch. The dorsal surface of the cleithrum gives attachment to the anterior (first) muscle of the inferior pharyngeal bone. The inner or the ventral surface of the cleithrum presents two high ridges, an anterior, to which is attached the anterior end of the coracoid and a posterior, running obliquely inwards and backwards, with the posterior edge of which articulate the coracoid and the scapula. The dorso-posterior portion of the cleithrum presents a deep hollow on its inner surface which is filled in with muscles during life. Embedded in these muscles and connected by means of ligaments to the inner surface of the posterior end of the triangular vertical portion is a stout curved rod-like bone—the *post-cleithrum*—which passes inwards and downwards lying internal to and across the radials. The dorsal end of the cleithrum forms a triangular piece which is covered over externally by the distal end of an elongated bone—the *supra-cleithrum*.

The *supra-cleithrum* is dagger-shaped in appearance and articulates with the outer surface of the dorsal end of the cleithrum. Externally it is covered over and partly overlapped by the posterior edge of the opercular bone. At its dorsal end, the supra-cleithrum articulates with a small conical bone—the *post-temporal*. The post-temporal fits into a groove on the dorsal surface of the pterotic and articulates anteriorly with the *supra-temporal* bone which partially overlaps the post-temporal.

(B) The Skeleton of the Pectoral Fin.

The skeleton of the pectoral fin like that of the median fins consists of two sets of structures : (*a*) the radials and (*b*) the dermal fin-rays (lepidotrichia).

The pectoral fin is supported by nineteen lepidotrichia, which are seated on four ossicles—the radials. The radials articulate directly with the scapula and the coracoid at the glenoid articulation. The first or the pre-axial radial is a stout bony piece which articulates with the posterior end of the scapula. The second radial, which is slightly bigger, articulates with the ventral edge of the scapula. The third radial is the biggest of the series and is connected by means of stout ligaments to the posterior end of the coracoid. The fourth or the post-axial radial abuts against the ventral edge of the third radial and does not form part of the glenoid articulation. The fin-rays which support the triangular pectoral fin are long slender jointed bony rods having essentially the same characters as those of the unpaired fins. The first or the pre-axial ray is the largest and unbranched. The two lepidotrichs of which the first ray is composed can be easily distinguished : one of them articulates directly with the scapula and the other with the first radial. The first three radials carry four rays each, while the fourth carries seven rays. The rays decrease in size as we pass from the pre-axial to the post-axial margin of the fin.

(*C*) *The Pelvic Girdle.*

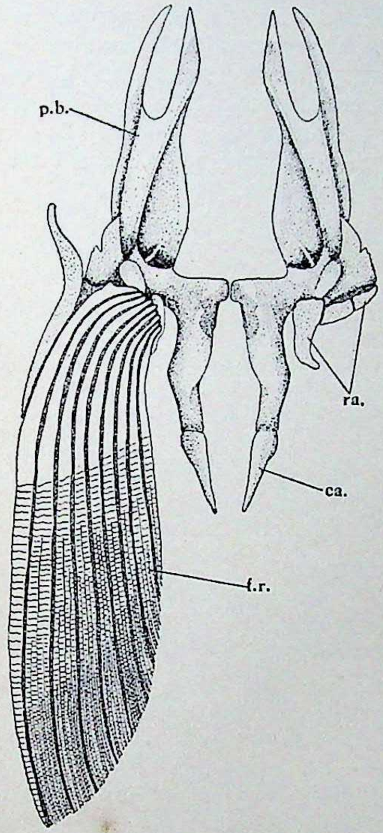

FIG. 26. Ventral view of the pelvic girdle and the right pelvic fin. (× *ca* 1¼). *ca.*, cartilage; *f.r.*, fin-ray; *p.b.*, pelvic bone; *ra.*, radial.

The *pelvic girdle* (fig. 26), unlike the pectoral, consists only of endo-chondral bones and small remains of the original cartilage. Each half of the originally cartilaginous girdle ossifies in the form of a separate bone called the *pelvic bone* [1] which lies in the ventral body-wall. A small piece at the hind end of the original cartilage remains unossified and this is attached as a small cartilaginous rod to the posterior end of the pelvic bone. Each pelvic bone consists of two parts: an anterior elongated broad portion which bears a prominent deep groove on its ventral surface and is forked in front and a posterior stout rod-like process which continues backwards into the narrow elongated piece of cartilage. The posterior process lies along the inner border of the pelvic fin and is connected with its fellow of the opposite side in the middle line. The anterior forked moiety is connected by means of ligaments to the rib of the twelfth trunk vertebra. The outer edge of the bone is almost straight while the inner edge is slightly curved.

(*D*) *The Skeleton of the Pelvic Fin.*

The pelvic fin is supported by nine fin-rays which are attached proximally to three small ossicles—the *radials*—these radials being in turn connected with the posterior border of the pelvic bone. The first or the outer radial is a double piece more or less triangular in shape. The second or the middle radial which is slightly bigger is again a double piece quadrangular in shape. The third radial is the biggest of the series and is represented by a single slightly curved piece thickened at its proximal end. The nine fin-rays which support the triangular pelvic fin are long slender jointed bony rods having essentially the same characters as those of the pectoral fins. The first or the pre-axial is the largest and is jointed but unbranched; while the remaining eight are jointed as well as branched. Besides these nine fin-rays, there is an extra curved piece of bone, attached to the proximal end of the first fin-ray. This is probably a supernumerary fin-ray.

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[1] Goodrich, E. S.—On the Pelvic Girdle and Fin of *Eusthenopteron*, *Q.J.M.S.*, V, 45, 1901.

Of the nine fin-rays proper, the first two radials carry two rays each, while the third carries five rays.

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Weather Types associated with Nor'-westers in Bengal.

By V. V. SOHONI.

SYNOPSIS.

The results of examining the Indian Daily Weather Reports of March, April, and May for 15 years, 1912–1926, lead to the definition of a nor'-wester day in Bengal, viz. a day on which at least 3 out of the 13 stations report thunderstorm phenomena. The most important types of weather associated with nor'-wester days are—the western disturbance type which is most common in March and April, the east-west gradient over Bengal type which is as common as the first, in May; and the temperature contrast type.

It seems that nor'-wester days generally occur when air masses probably with different histories and hence presumably different properties, e.g. Indian continental air and the Bay of Bengal maritime air, are in juxtaposition in Bengal or adjacent districts.

INTRODUCTION.

The thunderstorms and duststorms of the hot weather are familiarly known in Bengal and the adjoining provinces as nor'-westers. They are spectacular phenomena, which occasionally cause serious damage to property or life.

It is perhaps of some historical interest to refer here to the picture in Plate 12, Fig. 1. It is a copy of a sketch of a nor'-wester as seen from a place known as Respondentia Walk on the river side in Calcutta a century ago. The original, drawn in 1825, was the work of a certain J. B. Fraser, and a coloured lithograph of it is kept in the Victoria Memorial Hall in Calcutta, by the courtesy of whose authorities the reproduction was prepared.

In a previous paper (India Meteorological Department, Scientific Notes, Vol. I, No. 3) the present writer reviewed the characteristics of some 500 thunderstorms of Calcutta as recorded by autographic instruments during a period of over 25 years. A large majority of these thunderstorms were nor'-westers.

METHOD OF TREATMENT.

In order to find out whether any definite types of weather, as illustrated by the 8 A.M. weather charts of the Indian Daily Weather Report, are associated with the occurrence of nor'-westers in Bengal the following plan was adopted. The Indian

Daily Weather Reports of March, April, and May for the period of 15 years, 1912–1926, were consulted. Weather remarks were taken note of and remarks like thunderstorm, hailstorm, thunder, duststorm or nor'-wester were taken to represent phenomena of one family. In regard to this, one must bear in mind the element of uncertainty, which creeps in on account of the personal equation of observers at different stations. Consequently there is the possibility of the omission of any remark about the occurrence of thunderstorms, etc., perhaps by most observers on some occasions in a random fashion, and perhaps by some observers systematically for certain periods. But it is believed that as the period examined extended over 15 years this factor of error is not important.

The 15 years 1912–1926 were such that during the period the reporting stations in the divisions, Bengal, Chota Nagpur, Orissa and Bihar were constant and identical. Bengal with its area of 82 thousand square miles had 13 stations, Chota Nagpur and Orissa taken together, with area of 69 thousand square miles had 6, and Bihar with its area of 42 thousand square miles had 5 stations.

All days on which there were three or more stations in Bengal, Chota Nagpur, Orissa and Bihar reporting thunderstorm phenomena, were noted on forms of which the following is a specimen.

YEAR 1914.

Month April.

Date of Weather Report.	NUMBER OF STATIONS REPORTING THUNDERSTORMS.			REMARKS.
	Bengal.	Orissa and Chota Nagpur.	Bihar.	
1	2	2	0	Low pressure wave yesterday.
2	6	3	0	Trough over Bihar, Bengal with indraught of Bay winds.
3	8	2	0	
4	3	2	0	
5	6	2	1	
6	1	2	0	Nothing very marked.
7	4	3	0	Marked western depression over central parts and its passage eastwards.
8	8	1	0	
9	6	0	0	
10	7	1	1	

Date of Weather Report.	NUMBER OF STATIONS REPORTING THUNDERSTORMS.			REMARKS.
	Bengal.	Orissa and Chota Nagpur.	Bihar.	
13	2	1	0	Disturbance affecting extreme north of India.
14	5	0	0	Connected with above disturbance.
15	4	1	1	
16	3	3	0	
17	1	3	0	Nothing special noted.
18	7	2	0	Ill-defined disturbance passing over north-east India.
19	2	1	0	
20	2	1	0	
21	4	0	0	Nothing special noted.
22	3	1	0	
23	6	2	0	
24	7	1	0	
25	4	1	0	
26	4	1	1	
27	2	1	1	E-W gradient over north-east India.
28	8	3	0	
29	6	1	0	Very marked gradient at head of Bay.
30	2	1	0	
TOTAL No. 28	123	42	5	

After summarising the number of 'station-reports' of thunder and the number of days for each of the months, March, April, and May, a somewhat arbitrary definition of what one may call an average *nor'-wester day* in Bengal was fixed. Thus a nor'-wester day in Bengal is one which on an average has three stations, out of 13, reporting thunderstorm phenomena. Table I below shows that in Bengal in March, on an average, there are 6 'nor'-wester days' and 18 'station reports'; in April 14 'nor'-wester days' and 51 'station reports'; and in May 16 'nor'-wester days' and 48 'station reports'. Incidentally the mean values in the same table show the relative occurrence of thunderstorms in (*a*) Bengal, (*b*) Chota Nagpur and Orissa, and (*c*) Bihar. After proportionate weighting on account of differences in areas and varying numbers of stations, it is seen, that roughly speaking, the thunderstorm liability of the areas (*a*), (*b*), and (*c*) is as 10 : 7 : 1.

TABLE I.

Year.	MARCH.				APRIL.				MAY.			
	N	Bengal.	Chota Nagpur and Orissa.	Bihar.	N	Bengal.	Chota Nagpur and Orissa.	Bihar.	N	Bengal.	Chota Nagpur and Orissa.	Bihar.
1912	8	27	10	6	19	73	28	2	18	56	24	14
1913	2	4	4	0	4	16	5	1	16	51	37	9
1914	5	14	5	0	28	123	42	5	19	62	36	3
1915	13	45	19	1	13	50	17	1	26	77	51	7
1916	5	12	5	0	20	70	26	11	11	29	20	3
1917	3	9	4	0	15	60	20	3	18	58	30	0
1918	7	28	11	1	15	48	21	4	21	57	33	1
1919	7	15	15	1	21	80	34	2	23	76	42	1
1920	16	54	24	4	12	35	16	2	14	40	18	3
1921	3	9	1	0	16	65	10	7	12	42	9	4
1922	4	15	1	3	11	33	3	1	14	40	21	8
1923	2	5	3	1	8	17	8	4	12	37	13	3
1924	0	0	0	0	11	49	6	4	13	35	17	3
1925	3	13	0	0	10	34	9	2	7	23	5	2
1926	8	23	7	3	4	15	1	3	10	34	6	2
Sum	86	273	109	20	207	768	246	52	234	717	362	63
Mean	5·7	18·2	7·3	1·3	13·8	51·2	16·4	3·5	15·6	47·8	24·1	4·2

N=Number of days with 3 or more 'station reports' of thunderstorm in Bengal, Chota Nagpur, Orissa and Bihar taken together.

Figures under Bengal, Chota Nagpur, and Orissa and Bihar represent number of 'station reports' in the month.

After fixing upon the above-mentioned working definition of a 'nor'-wester day' in Bengal, days which contained less than three station reports of thunderstorms were neglected: and the main features of the conditions associated with the nor'-wester days, as inferred from the weather reports, were classified under different heads. These heads were:—

(1) The eastward passage of Western depressions or disturbances across northern India—either definite depressions or shallow low pressure areas or waves of low pressure.
(2) Pronounced East-West pressure gradient across Bengal and the adjoining provinces, in other words a North-South trend of the isobars, with a pressure gradient not less than about 50% above normal.
(3) Marked temperature contrasts in adjoining areas in north-east India *as shown by the isopleths of departure from mean temperature.* In such contrasts the most common features were high temperature in Assam and low temperature in an area, generally either in Bihar and Orissa or the United Provinces or the Central Provinces.
(4) Disturbances in the Bay.
(5) Inflow of moist Bay winds into Bengal after the passage of Bay storms into Arakan and Upper Burma.
(6) An advance of the monsoon.
(7) Absence of any ostensible reason.

The classification into (1), (2), and (3), is, in effect, not a classification into inherently distinct compartments. It is well within the range of probability that a number of cases of (2), and possibly some of (3) were also cases of (1). When a case was put under (2) or (3), rather than under (1), it meant that judging from the Daily Weather Report alone, there was no indication that it could go under (1).

The instances of (4), (5), and (6) are too few to justify their being recognised as very definite types, and from the physical point of view at least (5) and (6) may be classed together.

It is not uncommon to find nor'-wester days occurring in spells, occasionally extending to 4 or 5 days at a time. This is especially so in April and May.

Table II below gives the number of nor'-wester days, year by year, while Table III summarises the classification of the days according to associated weather types.

TABLE II.

Number of nor'-wester days in Bengal.

Year.	March.	April.	May.
1912	5	15	10
1913	1	4	8
1914	4	20	12
1915	7	9	13
1916	2	13	7
1917	2	14	14
1918	6	10	11
1919	3	17	15
1920	12	8	7
1921	2	15	9
1922	3	7	8
1923	1	2	7
1924	0	11	8
1925	3	6	6
1926	5	4	7
Sum	56	155	142
Mean	3·7	10·3	9·5

TABLE III.

Nor'-wester days in Bengal, 1912–1926 and weather types.

Types.	MARCH.		APRIL.		MAY.	
	No. of days.	Per cent. of total.	No. of days.	Per cent. of total.	No. of days.	Per cent. of total.
	56		155		142	
Western depression lows or waves of low pressure.	50	89	108	70	44	31

Types.	MARCH.		APRIL.		MAY.	
	No. of days.	Per cent. of total.	No. of days.	Per cent. of total.	No. of days.	Per cent. of total.
	56		155		142	
East-West Pressure Gradient.	1	2	17	11	55	39
Temperature contrast.	3	5	16	10	14	10
Disturbance in the Bay.	0	0	0	0	4	3
After storm disappears generally into Burma.	0	0	0	0	7	5
Advance of monsoon.	0	0	0	0	2	1
Unaccounted for.	2	4	14	9	16	11

In the course of examination of the weather reports, a number of cases came to notice in which storms or depressions from the sea came up into the north of the Bay and either went west into Orissa or east into Arakan.[1] In the case of these storms although there was occasionally more or less widespread rainfall in Bengal, chiefly in its eastern districts, conditions generally did not give rise to nor'-wester days: this was especially so in the case of storms that went to Arakan.

In connection with this subject of types, it is desirable to consider what types of weather prevail on days which are *non-nor'-wester* days for Bengal. Examination of a few years' charts showed that generally such days were characterised by one or more of the following features on the weather map:—

(*a*) Absence of recognised western depressions or moving *lows* over northern India. Disturbances, even if active, so long as they were confined to the extreme north-west of India, did not affect Bengal favourably for giving rise to nor'-wester days.

(*b*) Absence of pressure gradient over the greater portion of Indian area; in other words a *flat* pressure map. Such conditions were frequent in March and less so in April.

---

[1] These storms or depressions occurred in April 1922, and May 1912, 1914, 1915, 1917, 1918, 1923, 1924, and 1925.

(*c*) Absence of marked east-west pressure gradient over Bengal in particular, and over north-east India and the adjoining region to the west, in general.

(*d*) Anticyclonic distribution of pressure, especially over north-west India.

(*e*) On a generally *flat* pressure map, a relative *high* somewhere in the area comprising the United Provinces, Central India, the Central Provinces, and the adjacent portions of other provinces.

TENTATIVE CONCLUSIONS.

In the case of western disturbances and similar *lows*, which seem to be pre-eminently associated with nor'-wester days, at least in March and April, it is most probable that on the one hand there is the continental air brought by the westerly winds, from the Gangetic plain, and on the other the induced flow of maritime winds from the Bay. So also in the case of the east-west pressure gradient over Bengal, due to what may be called the accentuated May-type of pressure distribution over north-east India, we have the same thing happening, but this time, without the presence of a recognisable western depression. We have the north Indian continental air in juxtaposition with the air from the Bay flowing into north-east India under the influence of or in association with the pressure gradient. In May when the western depressions of cold weather type are no longer of frequent occurrence, or at least not recognisable as such, in the Daily Weather Reports, this gradient type surpasses in frequency the western disturbance type.

It may not be wrong to infer from the study of the Daily Weather Reports alone as summarised in Table III that nor'-wester days in Bengal probably occur when masses of air with different histories and therefore presumably different properties, meet somewhere over Bengal or the adjacent districts to the west.

In the case of nor'-wester days on which nothing except 'temperature contrasts' could be attributed as the predisposing cause, it is possible that the storms were of pure *heat* variety.

In the comparatively rare instances of nor'-wester days associated with a disturbance in the Bay, there is also presumably an incursion of maritime air from the Bay, into Bengal. A similar state of things must be responsible for the rare nor'-wester days after the disappearance of a storm in north Burma. The stream of air of marine origin, which temporarily under the influence of the storm, is diverted into Burma, is free after its disappearance, to flow into north-east India; and there meets with the north Indian air of presumably different properties.

A few illustrations of the three main types of weather charts associated with nor'-wester days are given at the end. They are :—

Western depression, etc.	6 April,	1913 (Fig. 2).
	7 April,	1914 (Fig. 3).
	15 May,	1923 (Fig. 4).
	11 March,	1925 (Fig. 5).
East-West Pressure Gradient.	28 April,	1914 (Fig. 6).
	29 May,	1914 (Fig. 7).
	21 May,	1915 (Fig. 8).
Temperature Contrast.	5 April,	1919 (Fig. 9).
	6 April,	1919 (Fig. 10).
	17 April,	1925 (Fig. 11).
	13 May,	1926 (Fig. 12).

These tentative conclusions are put forward with hesitation because they are based on impressions gathered from the inspection of Daily Weather Reports only.

The mechanism of nor'-wester formation cannot be understood satisfactorily without knowledge of the processes in the free air and of its thermal structure. This work of *sounding* the free air over Bengal is awaiting accomplishment.

The Observatory, Alipore, Calcutta.
The 13*th May*, 1929.

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REFRENCE BOOK

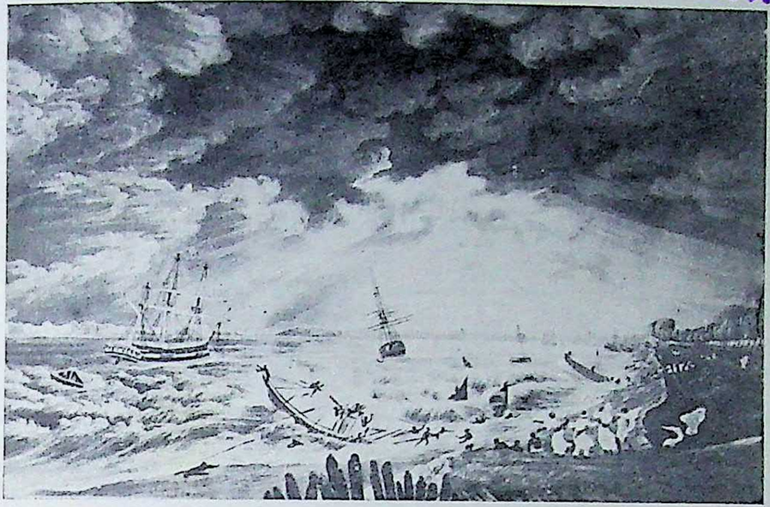
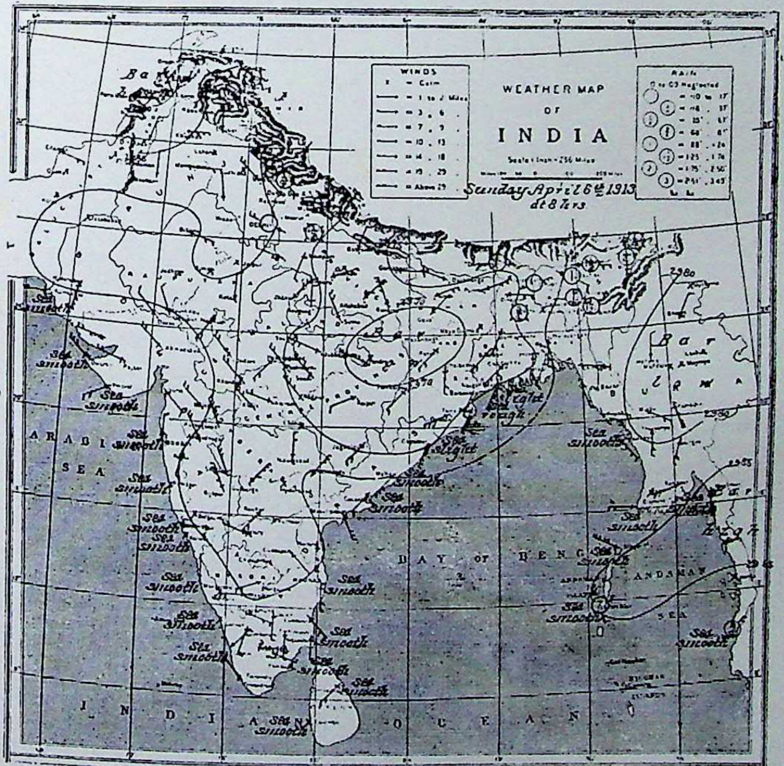


FIG. 1. Fraser's Nor'-wester Scene.



WEATHER MAP
OF
INDIA
Sunday April 16th 1913
at 8 hrs
WINDS
RAIN
ARABIAN SEA
BAY OF BENGAL
ANDAMAN SEA
INDIAN OCEAN
BURMA
Sea smooth
Sea slight
Sea rough

FIG. 2. Western Depression Type.

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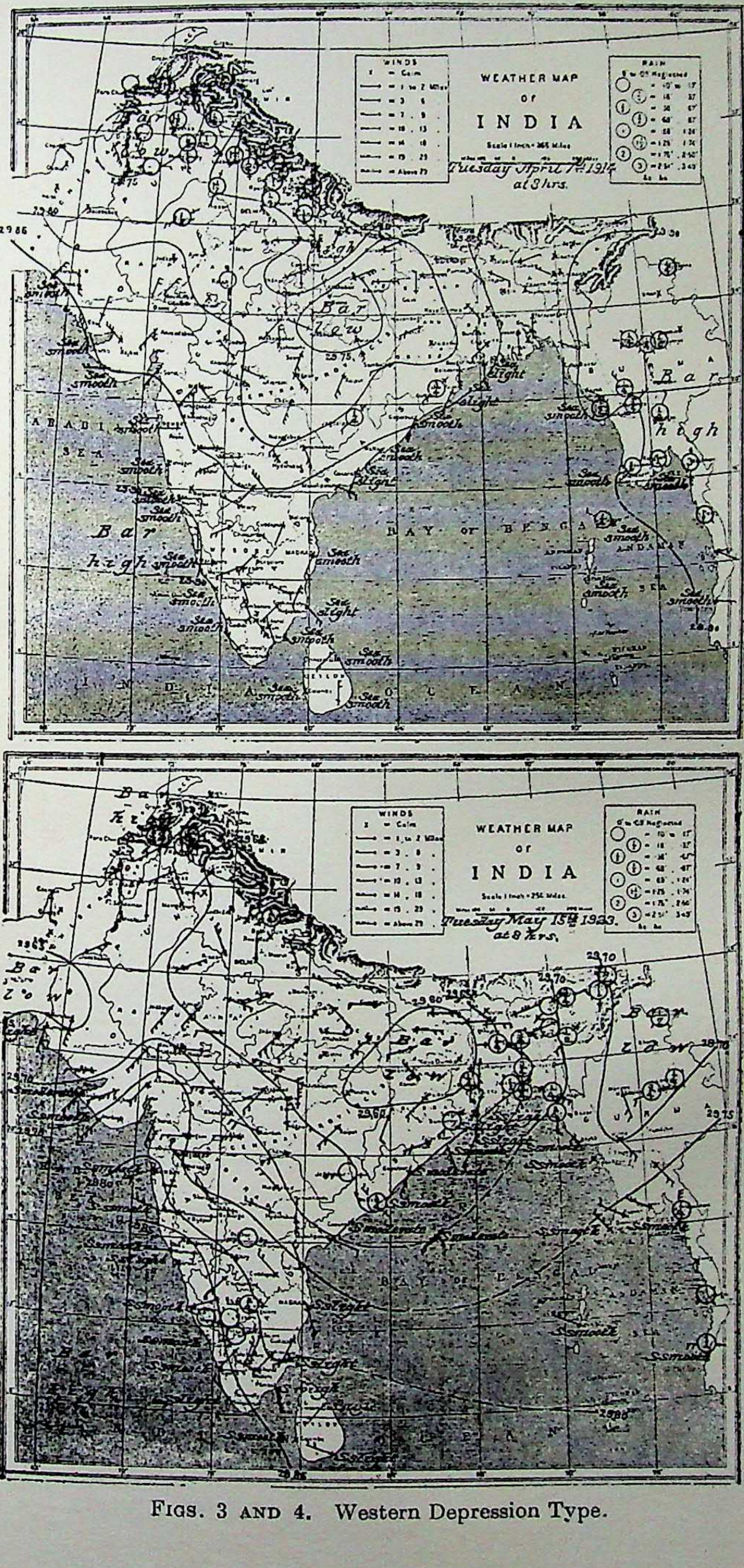

WEATHER MAP
OF
INDIA
WINDS
RAIN
Tuesday April 7th 1914
at 8 hrs.
Bar low
Bar high
Sea smooth
Sea slight
ARABIAN SEA
BAY OF BENGAL
INDIAN OCEAN
WEATHER MAP
OF
INDIA
Tuesday May 15th 1923
at 8 hrs.
Bar low
Bar high
S smooth
S slight
S moderate

FIGS. 3 AND 4. Western Depression Type.

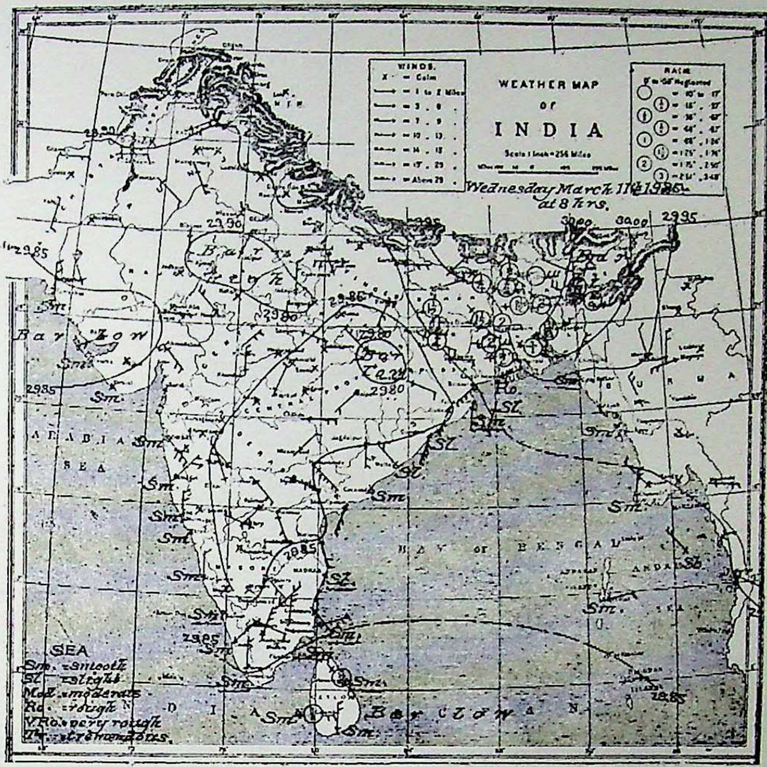

WINDS
WEATHER MAP OF INDIA
RAIN
Wednesday March 11th 1925
at 8 hrs.
Bar Low
Bar Low
Sm
SL
ARABIAN SEA
BAY OF BENGAL
SEA
Sm = smooth
SL = slight
MoL = moderate
Ro = rough
V.Ro = very rough
Ph = phenomenal
2985
2980
2990
2995
3000

Fig. 5. Western Depression Type.

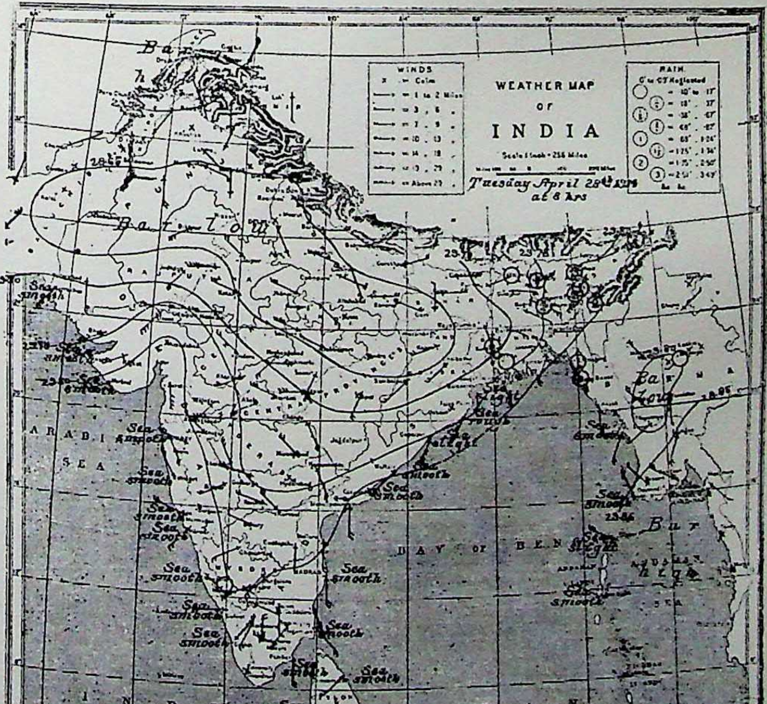
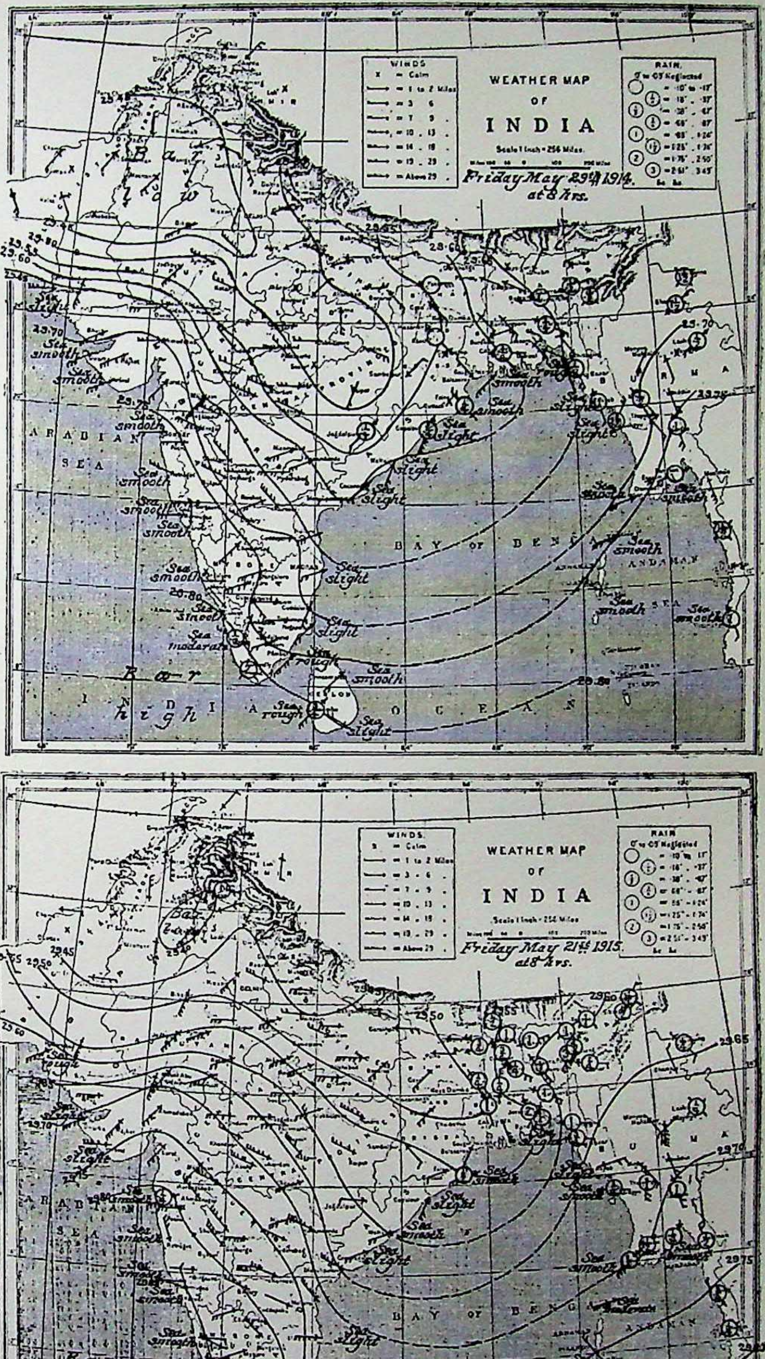
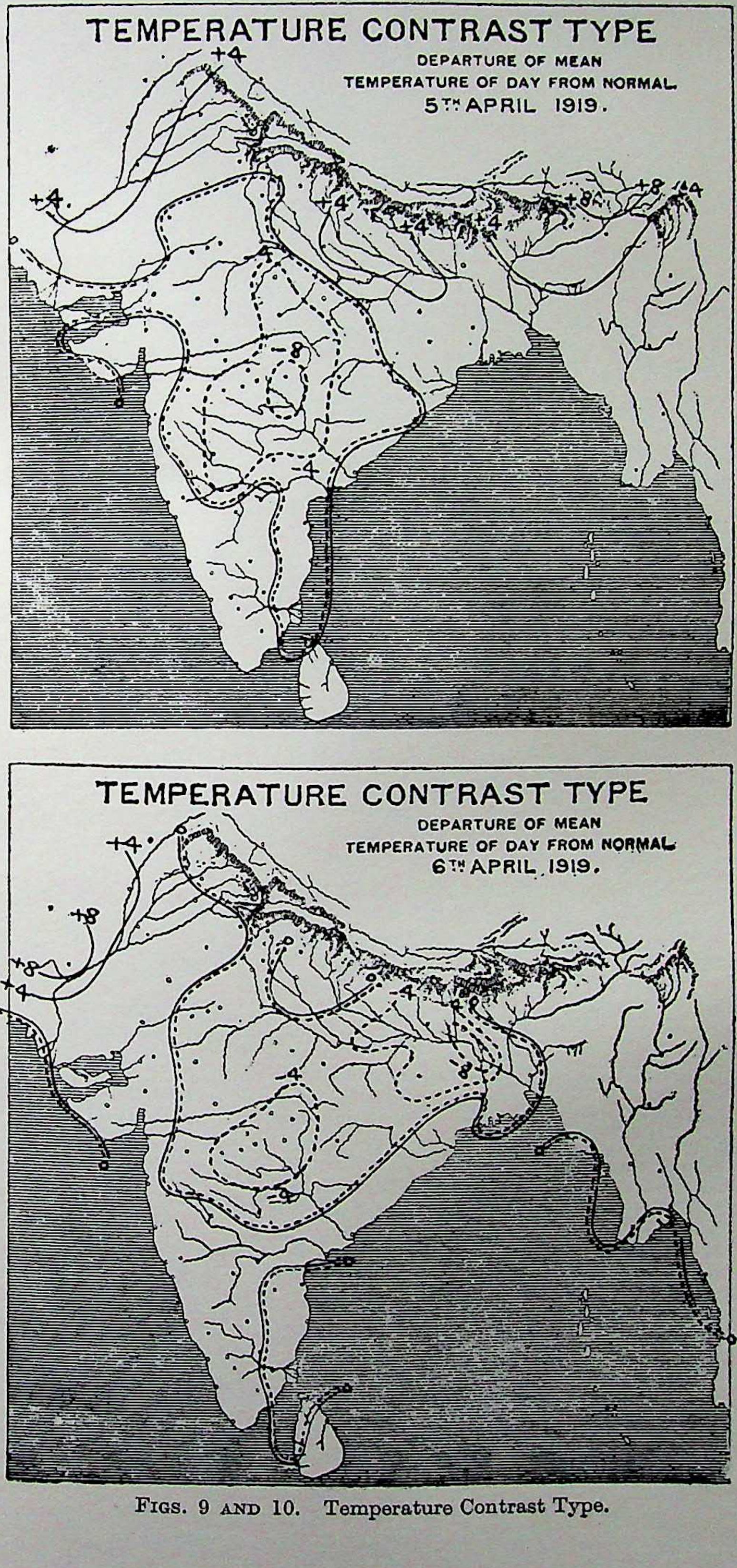

WINDS
WEATHER MAP OF INDIA
RAIN
Tuesday April 28th 1925
at 8 hrs
Bar Low
Bar Low
Bar high
Sea smooth
Sea slight
ARABIAN SEA
BAY OF BENGAL
INDIAN OCEAN

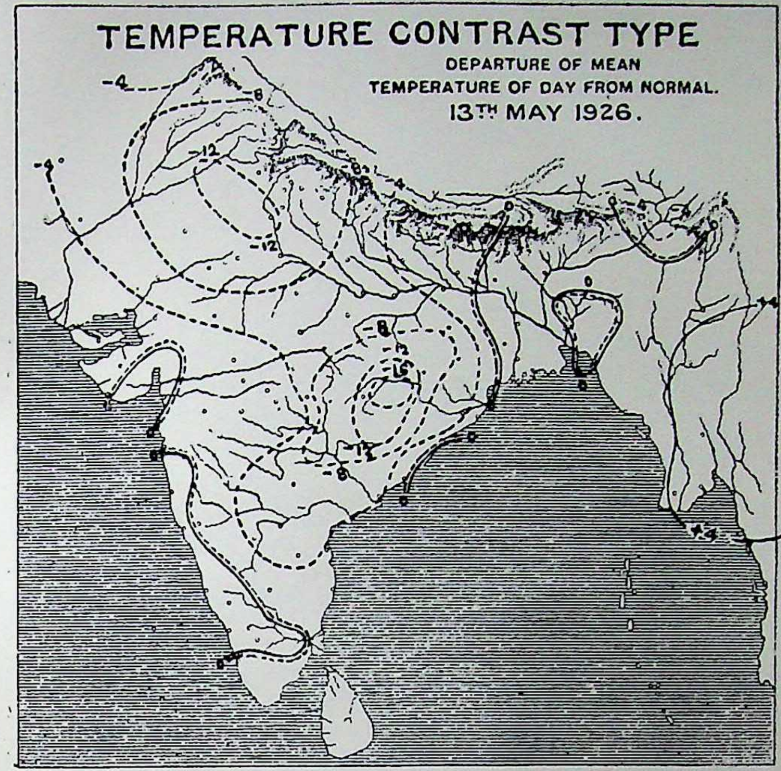
Fig. 6. East-West Pressure Gradient Type.


WINDS
WEATHER MAP OF INDIA
RAIN
Friday May 29th 1914. at 8 hrs.
ARABIAN SEA
BAY OF BENGAL
INDIAN OCEAN
Bar high
WINDS
WEATHER MAP OF INDIA
RAIN
Friday May 21st 1915. at 8 hrs.

FIGS. 7 AND 8. East-West Pressure Gradient Type.


TEMPERATURE CONTRAST TYPE
DEPARTURE OF MEAN
TEMPERATURE OF DAY FROM NORMAL.
5TH APRIL 1919.
+4
+4
+4
+4
+4
+4
+8
+8
+4
-4
-8
-4
TEMPERATURE CONTRAST TYPE
DEPARTURE OF MEAN
TEMPERATURE OF DAY FROM NORMAL.
6TH APRIL 1919.
+4
+8
+8
+4
0
-4
-8
-8
-4
-8

FIGS. 9 AND 10. Temperature Contrast Type.

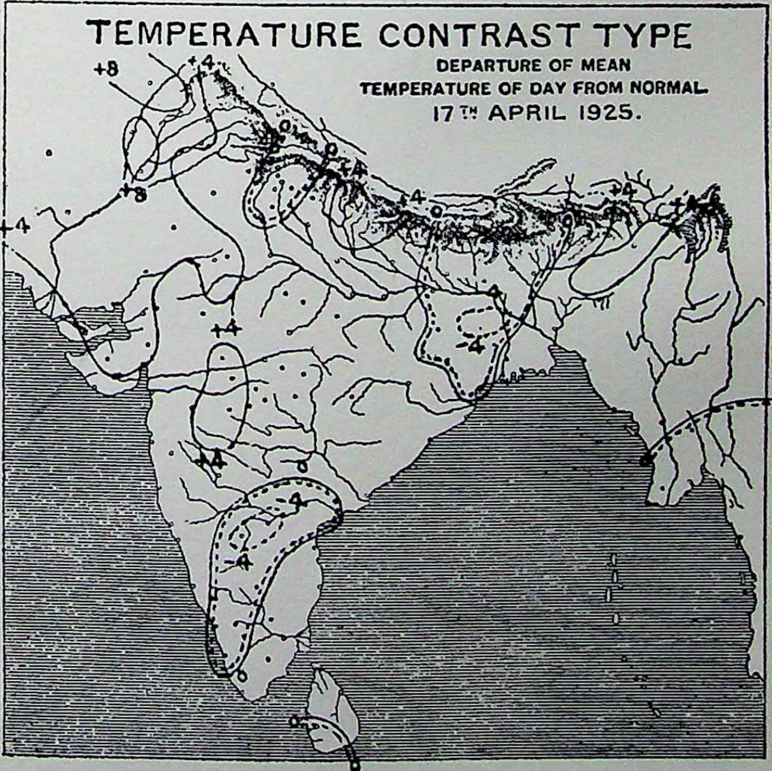


TEMPERATURE CONTRAST TYPE

DEPARTURE OF MEAN TEMPERATURE OF DAY FROM NORMAL.

13TH MAY 1926.

-4
-8
-4°
-12
-12
-8
-16
-12
-8
-4
0
0
+4
+4



TEMPERATURE CONTRAST TYPE

DEPARTURE OF MEAN TEMPERATURE OF DAY FROM NORMAL.

17TH APRIL 1925.

+8
+4
+8
+4
0
+4
+4
+4
+4
-4
+4
0
-4
-4
0
0

FIGS. 11 AND 12. Temperature Contrast Type.

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REFERENCE BOOK

ARTICLE No. 16.

Living Conifers of the Indian Empire.

By K. BISWAS.

While preparing the paper on 'The Distribution of Wild Conifers in the Indian Empire' published in the *Journal of the Indian Botanical Society*, Vol. XII, No. 1, pages 24–47, 1933, the author felt the need of drawing up a comprehensive list of names of Conifers grown in the Indian Empire. Frequently sterile specimens of Conifers received from different parts of the country without any history of its introduction or other details lead to lot of waste of time in determining their identity. Another source of trouble is the resentment to accept up-to-date nomenclature, the rules of which have been laid down by the Vienna Congress of Botanists in 1905 and approved at the last Horticultural and Botanical Congresses held in 1930. The following remark made by W. Dallimore in the Report of the Conifer Conference on page 6 of the 'Conifers in cultivation' published in 1932 is applicable to a large extent with regard to the Indian Flora :—'Opportunities for exchanging information and discussing vital questions between the officials of the various botanical institutions were rare, and the material available for examination was often scanty, therefore there was a lack of uniformity in the work accomplished and the foundation for very considerable confusion was laid. This confusion was made worse by some of the later workers, and in that way a multiplicity of names crept into gardens, many of which, although botanically obsolete, are retained to the present day'. Attempts have, therefore, been made to rectify this defect in nomenclature of the Conifers grown in this country. Recently a considerable amount of Conifers have been introduced in India, Burma, and Ceylon. Although the economic value of the Conifers is much appreciated in this country, Botanists, Foresters, Gardeners, and Amateurs show a considerable interest in cultivating Conifers in the various public and private gardens and estates in this country. E. L. Hillier in his article entitled 'Conifers of the temperate Regions of the Far East', on pages 223–242 of 'The Conifers in Cultivation' mentions only *Cephalotaxus Griffithii* Hooker, *C. Mannii* Hooker, *Cupressus torulosa* Don., *Podocarpus neriifolius* D. Don., *P. Wallichianus* C. Presl., and *Cedrus Deodara* Loud.

It is rather difficult to define exactly which species of the present day Indian Conifers are wild or cultivated under the strict sense of the terms, as some of both the wild and the cultivated ones are growing profusely side by side in suitable

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habitats, the wild ones in some cases extending the limit of their area of distribution. Some of the foreign Conifers have more or less acclimatised in this country. Of such species may be mentioned *Cryptomeria japonica*, an inhabitant of Japan. This species is now under profuse cultivation in the Darjeeling District and in the Nilgiris for its timber. *Thuja orientalis*, *Juniperus chinensis* and *Cupressus funebris* of China, *Araucaria Cunninghamii* of New South Wales, *A. Cookii* of New Caledonia and others are cultivated throughout India mostly for ornamental purposes. *Podocarpus elongatus*, a native of the Cape, was introduced in the Royal Botanic Garden, Calcutta in 1842. An account of such other cultivated Conifers growing in the northern part of this country has been given by R. N. Parker, in his important papers entitled 'The Cultivated Conifers of Northern India', published in the *Indian Forester*, Vols. 50 and 51 (1924-25). From these papers one may have sufficient information regarding the prevailing position and nature of distribution of the present day cultivated and introduced Conifers of this country in such climates as at Dehra Dun, Lucknow, Saharanpur and other areas of the Upper Gangetic Plains (Plate 21, Figs. 1 and 2). A successful attempt has also been made to grow them in the plains, and there are still about a dozen and a half representative species of Conifers of fairly large size surviving in the Royal Botanic Garden and other gardens in and about Calcutta and other provinces (Plates 18 and 19). In the Lloyd Botanic Garden, Darjeeling, there are at present more than fifty species under cultivation of which only a few are natives of Sikkim (Plate 20, Fig. 1). Some of these cultivated species had been introduced early in 1860. In the Royal Botanic Garden, Peradeniya, and Hakgala Botanic Garden, Ceylon, there are up to the present time also about fifty species of Conifers under cultivation (Plate 20, Fig. 2; Pl. 22, Fig. 2; and Pl. 23, Figs. 1 and 2). Some of the species had been introduced as early as 1848. About twenty-six species have been traced growing in Burma, of which fifteen species are supposed to be indigenous and the rest are cultivated. The earliest date of introduction of Conifers in the Indian Empire is 1799, when *Podocarpus elongatus* along with a few others had been planted in the Royal Botanic Garden, Calcutta, by William Roxburgh, the then Superintendent of the Honourable East India Company's Botanic Garden, Calcutta, by which name the Royal Botanic Garden, Calcutta, was known at that time.

In spite of my recording 106 species in the present paper, I consider this as a working list of Conifers, as it is rather difficult to get specimens and authentic names from all the gardens and forest areas. It is, therefore, expected that supplementary list in future years will complete this task with the help of welcome co-operation of those interested in Conifer cultivation in this country.

The introduced and cultivated species, as far as could be ascertained at present, are about one hundred and eight in number as mentioned in the following pages. The species of Conifers noted here have been compiled from the lists kindly furnished by Forest Officers and Keepers of the different gardens of this country. But it appears, while examining specimens and the names mentioned in some of the lists forwarded, that the identifications of some of the species of Conifers growing in different gardens and elsewhere of this country require correction and some of the names adopted deserve alteration in the light of up-to-date nomenclature. Necessary emendations have, therefore, been made as far as possible in the names adopted, accepting in general the nomenclature followed in Index Kewensis and by W. Dallimore and A. B. Jackson in their splendid book entitled 'A Handbook of Coniferæ', 1931.

Apart from the twenty-three Indian wild species of Conifers representing about 21·5% of the total number recorded here, the percentages of the introduced Conifers in this country may approximately be put down as follows: Chinese and Japanese 21·5%; American 15%; European 11%; African 4·5%; Malaysian, Polynesian, and other Pacific and Atlantic Island areas 8%; Australian and New Zealand 6·5%. From these it will be seen that in this country like other parts of the Northern Hemisphere, the Chinese and Japanese specimens preponderate in the cultivation of foreign Conifers. The species from the Southern Hemisphere do not seem to do very well in regions beyond the equatorial zone. I am, therefore, led to confirm Parker's statement which runs as follows: 'With scarcely any exceptions plants from the Southern Hemisphere are more particular in their climatic requirements than those of the North. Plants from the Southern Hemisphere become naturalized in the North under rather special climatic conditions, e.g. California, Nilgiris, and the Mediterranean coast.' Lloyd Botanic Garden, Darjeeling, Peradeniya and Hakgala Gardens, Ceylon, and the Nilgiris are particularly favourable for the cultivation of Conifers. The Northern Indian Gardens, specially Dehra Dūn also stocks a large number of introduced Conifers which seem doing well there. The South African, Malayan, and Polynesian species favours Nilgiris and South Burma for their accommodation when cultivated. The indigenous Conifers are confined to the West and the Eastern Himalayas, particularly in the subtemperate and temperate regions of the Central Himalaya from Kumaon, Garhwal and beyond in the West to Nepal and beyond in the East.

My thanks are due to the Superintendents and Curators of the various gardens and Forest Officers of the different districts of India, Burma, and Ceylon for their kindly taking the trouble of supplying information on Conifers growing in their localities. I am indeed grateful to Mr. T. H. Parsons, Curator, Royal Botanic Garden, Peradeniya, for his supplying valuable data of Ceylon Conifers and a full set of photographs of the Conifers cultivated in the gardens in Ceylon. Some of the photographs of the representative species have been incorporated in this article. I am also deeply indebted to Mr. R. N. Parker, Forest Botanist, Dehra Dun, for his kindly supplying important references and valuable data, some photographs of Conifers cultivated in the arboratum at Dehra Dun and for his permitting me to publish the following extract of his letter to me, embodying his idea on the distribution of wild and introduced Conifers in general. His note might be of some use to gardeners interested in introducing foreign species of Conifers in this country.

Extract from Mr. R. N. Parker's letter dated the 25th April, 1929.

'From my own results one might conclude that certain genera such as *Juniperus*, *Cupressus*, and *Podocarpus* were formerly much more universally distributed than they are now. The members of these genera seem to be maintaining themselves in more or less isolated and specialized habitats and this seems to be a question of competition with other plants.

The Coniferæ seem to be rather sharply divided into Northern genera and Southern genera, the latter being again divided more or less according to the land masses. The Southern genera such as *Callitris*, *Araucaria*, and *Widdringtonia* do not seem to be accommodating climatically, but this is I think merely because in the Southern Hemisphere climatic conditions are much more uniform than in the Northern. With scarcely any exceptions plants from the Southern Hemisphere are more particular in their climatic requirements than those of the North. Plants from the Southern Hemisphere become naturalized in the North only under rather special climatic conditions, e.g. California, the Nilgiris, and the Mediterranean coast. When plants from Australia are taken to South Africa, the results are different. *Araucaria* and *Callitris* grow very well all over South Africa.

Some of the Northern genera of the Coniferæ such as *Abies*, *Picea*, *Larix*, etc. are temperate and they do particularly well in the Southern Hemisphere except in New Zealand, where they appear to thrive but are not really at home. A *Larix* plantation in New Zealand in winter shows some trees in fresh spring foliage others bare and others with the old leaves still on the trees.

My impression of the Coniferæ is that some genera are dying out, specially the smaller Southern genera, so are some of the Northern, such as *Cedrus*, *Cupressus*, etc. Other genera such as *Pinus*, *Abies*, and *Picea* are far from being decadent and probably occupy a bigger area now than they have ever done in the past though perhaps not so numerous in individuals.

The results of cultivation in India only are insufficient to draw conclusions or rather I should say obtain impressions and the question is complicated by possible factors such as *Mycorhiza.*'

LIST OF CONIFERS GROWN IN THE INDIAN EMPIRE.

(1) **Abies balsamea** Miller. (Balsam Fir.)

This is a North American species. It was introduced in the Lloyd Botanic Garden, Darjeeling, in 1901.

(2) **Abies Nordamanniana** Spach. (Caucasian Fir.)

This species, originally occurring along the South and South-East shores of the Black Sea and on the Western ranges of the Caucasus Mountains, was introduced in the Lloyd Botanic Garden, Darjeeling, in 1901.

(3) **Abies pectinata** De Candolle. (European silver Fir.)

It is an inhabitant of the forests on the mountain ranges of Central and Southern Europe and was introduced in the Lloyd Botanic Garden, Darjeeling, in 1914.

(4) **Abies Pindrow** Spach. (West Himalayan Fir.)

This species, which Brandis considers as a variety of *A. Webbiana*, occurs all along the Western Himalaya from Afghanistan to Nepal but at a lower elevation (6,000 to 12,000 ft.) than that of *A. Webbiana*.

(5) **Abies Webbiana** Lindley. (Webb's Himalayan Fir.)

This indigenous species spreading on the mountain slopes of higher altitudes than that of *A. Pindrow* resembles with it very closely. From an elevation of (9,000 to 12,000 ft.) it is frequently found to form a more or less pure association, growing wild along the inner ranges of the Himalayas from Afghanistan to Bhutan between elevations of 8,000 to 13,000 ft. It is supposed to be wild in Northern Burmese temperate Himalayas too, and is available in the Lloyd Botanic Garden, Darjeeling and Assam.

A specimen of *Abies* sp. was received by Mr. C. E. Parkinson from Burma, which appears to be a form of *Abies Delavoyi* Franchet, a South-West Szechuen species which was evidently introduced in the North-Eastern spurs of the high ranges of the Burmese and Chinese border lands.

(6) **Agathis australis** Salisbury (Kauripine).

This important forest tree of the mountains of the North Island of New Zealand is said to have been imported in Ootacamond.

(7) **Agathis loranthifolia** Salisbury. (Amboyana Pitch tree.)

This dammar yielding tree 'Dammer resin' is indigenous to Malayan and Polynesian regions. It was cultivated in the Royal Botanic Garden, Calcutta, and had been introduced in the Royal Botanic Garden, Peradeniya, Ceylon, in 1881.

(8) **Agathis obtusa** Masters.

This was introduced in the Royal Botanic Garden, Peradeniya, Ceylon, in 1865. This is evidently a synonym of *Dammara obtusa*.

(9) **Agathis robusta** Masters. (Queensland Kauri.)

This species, a native of Queensland and Fraser Island, had been introduced in Peradeniya, Ceylon, in 1865. In Dehra Dun it is about 20 years old, and attempts have been made to grow it in the Agri-horticultural Gardens, Calcutta.

(10) **Araucaria Bidwilii** Hooker. (Bunya Bunya.)

This tree, wild along the coast district of Queensland, is one of those few Conifers which can be grown successfully in the tropical hills and plains too. The ripe fruits are edible. It is available in the Royal Botanic Garden, Calcutta; Lloyd Botanic Garden, Darjeeling, where it was introduced in 1880; Royal Botanic Garden, Peradeniya and Hakgala Garden, Ceylon —(planted in 1848); Agri-horticultural Garden, Calcutta; Dehra Dun (introduced 40 years ago); Amritsar; Ootacamond; Victoria Garden, Bombay and Burma.

(11) **Araucaria brasiliana** Richard. (Candelabra tree.)

This species is an important timber tree of Brazil and Argentine—imported in the gardens of Ootacamond.

(12) **Araucaria Cookii** R. Brown. (Cook's Araucaria.)

This is wild in the forests of New Caledonia, Polynesia, and the Isle of Pines. The tree has not much timber value but can be grown successfully in the hills and plains of this country. It is present in the Royal Botanic Garden, Calcutta; Lloyd Botanic Garden, Darjeeling (introduced in 1924); Royal Botanic Garden, Peradeniya, Ceylon (introduced in 1865); Agri-horticultural Garden, Calcutta; Dehra Dun; Ootacamond; Udaipur; Gwalior; Victoria Garden, Bombay; Madras; Travancore and Burma.

(13) **Araucaria Cunninghamii** Aiton. (Moreton Bay Pine.)

It is a native of New South Wales, the South Coast district of Queensland and Dutch West New Guinea. It can be grown successfully in the hills and plains of India. The timber can be used for useful purposes. The tree is found in the Royal Botanic Garden, Calcutta, where dwarfed prostrate form has

also been grown successfully ; Lloyd Botanic Garden, Darjeeling (introduced in 1900) ; Royal Botanic Garden, Peradeniya, Ceylon (introduced in 1848) ; Agri-horticultural Garden, Calcutta ; North-West Frontier Province ; Lahore ; Northern India ; Ootacamond ; Victoria Garden, Bombay ; Madras ; Travancore and Burma.

(14) **Araucaria excelsa** R. Brown. (Norfolk Island Pine.)

This species is a native of Norfolk Island and had been grown successfully in the Royal Botanic Garden, Calcutta, but died a few years ago. It was introduced in 1848 in the Royal Botanic Garden, Peradeniya, and Hakgala Gardens, Ceylon, in 1848. This has been recently introduced in Dehra Dun ; Udaipur ; Victoria Garden, Bombay ; Madras and Travancore.

(15) **Araucaria imbricata** Pav. (Chile Pine.)

The tree, native of Chile, Tierra del Fuego and N. Patagonia, is popularly known as 'Monkey Puzzle'. It has timber value and its fruits are edible. This was introduced in Hakgala Garden, Ceylon, in 1886 and is reported to have been introduced in Assam.

(16) **Callitris glauca** R. Brown. (Murray River Pine.)

This species is a good Australian timber plant and has been introduced in Dehra Dun about seven years ago.

(17) **Callitris rhomboidea** R. Brown. (Illawara Mountain Pine.)

It occurs sporadically in Queensland and New South Wales near Sydney. J. S. Gamble collected specimens of this plant in 1883 from Conoor, Nilgiri District, Madras, at an altitude of 6,000 ft. It was introduced in the Royal Botanic Garden, Peradeniya, and Hakgala Garden, Ceylon, in 1886. It has been planted in the Agri-horticultural Garden, Calcutta, in Dehra Dun, and in Ootacamond of late years.

(18) **Cedrus Deodara** Loudon. (The Deodar.)

This species is a West Himalayan plant of considerable economic importance for its yielding fragrant oil and durable wood when grown under natural conditions. This was planted in 1895, in the Lloyd Botanic Garden, Darjeeling. It is met with abundantly in the North-West Frontier Province, Kashmir West and Ootacamond.

(19) **Cephalotaxus drupacea** Siebold and Zuccarini. (Cow's tail Pine.) *var.* **pedunculata** Miquel.

This variety, which is considered as a hybrid between *C. Fortunii* and *C. drupacea* by Prof. Henry, has recently been introduced in Dehra Dun. *C. drupacea* is a native of the forests in the mountains of Japan and Central China.

(20) **Cephalotaxus Fortunii** Hooker.

This is a Chinese species which is said to have been planted in Burma.

(21) **Cephalotaxus Griffithii** Hooker.

It occurs in Assam (Naga Hills, Mishmi, and Manipur) and Burma (Ruby mines).

(22) **Cephalotaxus Mannii** Hooker.

It is a native of the Khasia mountains, Assam, and is also frequently met with in Ruby mines, Burma.

(23) **Cryptomaria japonica** Don. (Japanese Cedar.)

This is one of the most valuable timber trees of China and Japan where it grows wild. It has been successfully cultivated in the North-West Frontier Province ; Ootacamond ; Mussourie ; Lloyd Botanic Garden (introduced in 1860), and throughout Darjeeling and Sikkim Himalaya above an elevation of 3,000 ft. This is also commonly grown in the Nilgiri Hills of Madras Presidency, Khasia and Naga Hills, Manipur in Assam ; and in Upper Burma. This was planted in the Royal Botanic Garden, Peradeniya and Hakgala Garden, Ceylon, in 1894. In the Calcutta Herbarium specimens of this species from the following localities in India are available : Kumaon—7,500 ft. N. Gill, 1913 ; Mussourie, G. King ; Eastern Himalaya ; Sureil, C. C. Calder ; Kurseong, A. C. Modder, 1915 ; Mungpoo, G. King, 1881 ; Khasia Hills, 5,000 ft., G. Mann, 1878 ; Sikkim Himalaya, G. Watt, 1881 ; Thunberganum, 6,000 ft., Rev. Aug. Saulieres, 1905 ; Yunan Expedition, Dr. T. Anderson, 1863.

(24) **Cunninghamia Sinensis** R. Brown. (Chinese Fir.)

This is a very useful tree of Central and Southern China, introduced in Dehra Dun about forty years ago.

(25) **Cupressus arizonica** Greene. (Arizona Cypress.)

This is a native of the mountains of Arizona and North Mexico. It has been introduced in Dehra Dun and the plant is of about 15 ft. in height, bearing cones ; cultivated in Gwalior gardens also.

(26) **Cupressus cashmiriana** Royle. (Kashmir Cypress.)

This is the most beautiful cypress in India considered evidently wild in Kashmir. But its occurrence only in the East Himalaya is recorded.

(27) **Cupressus funebris** Endlicher. (Chinese weeping Cypress.)

This beautiful plant, a native of Central China is successfully cultivated in the hills and plains of India, Burma, and Ceylon. This is frequently met with in the mountain ranges of the Eastern Himalaya in Nepal, Sikkim, and Bhutan from a lower elevation to an altitude of over 8,000 ft. It has also been found growing in Maymyo forest lodge, Burma, at an elevation of 3,000 ft. Elegant specimens of this tree can be seen growing in the Royal Botanic Garden, Calcutta ; Lloyd Botanic Garden, Darjeeling (introduced in 1901) ; Agri-horticultural Garden, Calcutta ; Royal Botanic Garden, Peradeniya and Hakgala Garden, Ceylon (introduced in 1903) ; Lahore ; Gwalior, Ootacamond ; North-West Frontier Province and Northern Burma.

(28) **Cupressus Goveniana** Gordon. (Californian Cypress.)

This species, an inhabitant of the Coastal mountains of California, was introduced in the Lloyd Botanic Garden, Darjeeling in 1906.

(29) **Cupressus gracilis** Hort.

This was introduced in Hakgala Garden, Ceylon, 1893.

(30) **Cupressus himalayensis** Hort.

This is reported to have been growing in Assam.

(31) **Cupressus Lawsoniana** Murray. (Lawson Cypress.)

It is a useful cypress widely distributed in the Conifer forests of the mountains of S.-W. Oregon and N.-W. California. This species has been introduced in the Lloyd Botanic Garden, Darjeeling in 1901, and in Hakgala Garden, Ceylon in 1893.

var. **Flecheri** is supposed to have been planted in Ootacamond.

(32) **Cupressus Lindleyi** Klotzsch.

This has been planted in the Lloyd Botanic Garden, Darjeeling, in 1904, and in Royal Botanic Garden, Peradeniya and Hakgala Garden, Ceylon, in 1892. It is also grown in Ootacamond and North-West Frontier Province.

(33) **Cupressus lusitanica** Miller, *var.* **Benthami** Carriere. (Mexican Cypress.)

This is a native of Mexico. There is not much evidence to prove that this fine Conifer is indigenous to India, though it is sometimes thought to be wild in Goa and distributed to the different parts of the world by Portuguese monks. Its occurrence in the N.-W. Himalaya, as reported, indicates its early introduction in this country. It has been grown in Kablagarh Tea Estate, and at Dehra Dun by Parker in recent years.

(34) **Cupressus macrocarpa** Hartweg. (Monterey Cypress.)

This Conifer, a native of Monterey in California, was planted in the Lloyd Botanic Garden, Darjeeling, in 1904 ; Royal Botanic Garden, Peradeniya and Hakgala Garden, Ceylon in 1880. It is under cultivation also in Ootacamond.

(35) **Cupressus obtusa** Koch. (Hinoki) *var.* **aurea.**

This is distributed in the Southern and Central Japan. This was planted in 1901 in the Lloyd Botanic Garden, Darjeeling. It is reported to grow in Ootacamond as well.

(36) **Cupressus pisifera** Koch. (Sawara Cypress.)

This species occurs in wild state in the hills of the Central and Southern mainland of Japan. This was introduced in 1901, in the Lloyd Botanic Garden, Darjeeling.

(37) **Cupressus sempervirens** Linnæus. (Mediterranean Cypress.)

This species is indigenous to the mountains of North Persia, Silesia, Greece, and islands of Rhodes, Crete and Cyprus. Beautiful specimens are available in the Lloyd Botanic Garden, Darjeeling, where it was introduced in 1904. In 1922, it was planted in the Royal Botanic Garden, Peradeniya and Hakgala Garden, Ceylon. It is also under cultivation in the North-Western Provinces, Lahore, Gwalior, Udaipur, Central Provinces and Northern Burma. (Collected from Maymyo plateau at an elevation of 3,500 ft. by C. G. E. Dawkins.)

var. **pyramidalis**—was planted in the Lloyd Botanic Garden, Darjeeling in 1902. It is being tried to keep it growing in the Agri-horticultural Garden, Calcutta. *C. fastigiata* of DeCandolle is reduced by Dallimore and Jackson to var. *stricta* of *C. sempervirens*. This variety is grown in Ceylon Gardens.

(38) **Cupressus torulosa** Don.

This fine tall Conifer, an inhabitant of the outer ranges of the Western Himalaya above 4,000 ft. elevation, is under cultivation in the Royal Botanic Garden, Calcutta; Lloyd Botanic Garden, Darjeeling (introduced in 1901); Royal Botanic Garden, Peradeniya and Hakgala Garden, Ceylon (introduced in 1922); North-West Frontier Province; Lahore; Ootacamond and Central Provinces; Assam; Northern Burma. Herbarium specimens have been collected from South India also at an elevation of 9,000 ft. by A. Meebold in 1909, from Nadduvaddam; from St. Mary's Kodaikanal, Madras by Rev. Aug. Sauliers in 1913; from Nilgiris in 1857 and Coonor, Nilgiri in 1898 by D. Prain.

(39) **Ginko Bilolba** Linnæus. (Maidenhair tree.)

Magnificent specimens of this tree which are believed to be more than 1,000 years old are found growing in and about the Buddhist temples in China, Japan, Manchuria and Corea where they are supposed to be introduced by Buddhist priests long long years ago. The predominance of the growth of this Maiden hair tree in Changhua Hsien Cheikiang Provinces of China suggests its wild growth in these parts. Rather poor representative of this species have been preserved alive in the Royal Botanic

Garden, Calcutta; Agri-horticultural Garden, Calcutta; and Northern India (N.-W. F. Province). A fairly large sized tree is found growing at Rambag in Amritsar (Plate 22, Fig. 1).

(40) **Juniperus bermudiana** Linnæus. (Bermuda Cedar.)

This plant is indigenous to Bermuda. Cultivated specimens of this species are available in the Agri-horticultural Garden, Calcutta; Royal Botanic Garden, Peradeniya and Hakgala Garden, Ceylon where it was introduced in 1868; Lahore and Ootacamond. In Dehra Dun it has been planted only six years ago, and the plant is now about 15 ft. in height and bears fruits.

(41) **Juniperus Cedrus** Webb and Berthelot. (Canary Island Juniper.)

It is found wild in Canary Islands and is growing from 1916 in the Royal Botanic Garden, Peradeniya and Hakgala Garden, Ceylon.

(42) **Juniperus chinensis,** Linnæus. (Chinese Juniper).

This species, distributed in China, Mongolia and Japan, has been growing in the Agri-horticultural Garden, Calcutta; North-West Frontier Province, Lahore and Madras.

(43) **Juniperus communis,** Linnæus. (Common Juniper.)

This is one of the common Junipers under cultivation in the Agri-horticultural Gardens, Calcutta; North-West Frontier Province and Madras. It is distributed in the Northern and Central Europe and in the mountains of the Coastal regions of Asia Minor, the Caucasus, Persia, Afghanistan, the Western Himalaya, the United States and Canada.

(44) **Juniperus excelsa** Bieberstein. (Grecian Juniper.)

This species is indigenous to the forests of the mountain ranges of Asia Minor where the wood is of much economic importance. It is sometimes believed that the wood of this tree is the true 'Cedar of Lebanon' of the Bible and not that of *Cedrus Libani*. This was grown in the Hakgala Garden, Ceylon, as early as 1889. Specimens of this species were collected by R. Strachey and J. E. Winterbottom at an altitude of 11,500 ft. from Milum, Kumaon; and in 1847 J. E. Winterbottom gathered the same species in Gode in Hasora, Tibet.

(45) **Juniperus macropoda** Boissier. (Kabuli Juniper.)

This species which is confined to the N.-W. Himalaya and further West is an important plant used for various domestic purposes and sometimes burnt as incense. The wood may be tried for the manufacture of pencil. To have a popular name, I have called it Kabuli Juniper.

(46) **Juniperus Oxycedrus** Linnæus. (Sharp Cedar.)

It is wild throughout the Mediterranean region and has been planted in Dehra Dun about six years ago.

(47) **Juniperus phoenicea** Linnæus. (Phoenician Juniper.)

This species, a native of Phoenicea, was planted in Dehra Dun about three years ago.

(48) **Juniperus procera** Hochstetter. (East African Cedar.)

It is wild in the mountain forests of Kenya and Abyssinia, between 5,000 and 7,000 ft., and has recently been introduced in Dehra Dun.

(49) **Juniperus recurva** Buchanan-Hamilton.

This species is distributed all along the Eastern Himalaya between 8,000 and 13,000 ft., and abundant in Sikkim and Bhutan. This is under cultivation in the Royal Botanic Garden, Calcutta and Lloyd Botanic Garden, Darjeeling where it was planted in 1904. In Lahore and Lyallpur Dwarf bushy form is also successfully cultivated. It is also found growing in the North-West Frontier Province and North-East hills of Burma. The wood is used as incense by Buddhist priests.

(50) **Juniperus Sabina** Linnæus. (Savin.)

This is a Central and Southern European Conifer supposed to have been planted in Ootacamond under the name of *J. prostrata* which is a synonym of *J. Sabina*.

(51) **Juniperus virginiana** Linnæus. (Pencil Cedar.)

One of the most valuable Conifers whose wood is used for the manufacture of lead pencils and various other economic purposes, grows wild in the Eastern and Central United States and Eastern Canada. It was introduced in the Royal Botanic Garden, Peradeniya in 1888 and cultivated in Ootacamond and Dehra Dun where it was planted about nine years ago.

(52) **Juniperus Wallichiana** Hooker fil. (Black Juniper.)

J. D. Hooker reduces this species to Juniperus pseudo-Sabina. But I have here followed Dallimore and Jackson in reducing *J. pseudo-Sabina* Hooker to *J. Wallichiana* Hk. F.

An indigenous species extending throughout the West and Eastern Himalayas—was planted in 1904 in the Lloyd Botanic Garden, Darjeeling. It is abundant in North-West Frontier Province and Kashmir.

(53) **Larix europaea** De Candolle. (Common Larch.)

This European Larch is one of the most useful trees growing wild in the Alps of the Central Europe and mountains of Northern Russia and Siberia. It was planted in 1901 in the Lloyd Botanic Garden, Darjeeling.

(54) **Larix Griffithii** J. D. Hooker. (Sikkim Larch.)

This is a native of the Eastern Himalayan ranges which was planted inside the Lloyd Botanic Garden, Darjeeling, perhaps in 1911 or thereabout.

An interesting specimen of *Larix Potanini* Batalin, the 'Red Fir', was received from Mr. C. E. Parkinson as one of the Conifers growing wild in Burma. This is an instance how a Chinese species common in West Szechuen and Chino-Tibetan borderland extends into the temperate Burmese Himalayas, crossing the limit of its original range of distribution. The same remark applies to *Abies Delavayi* of Burma.

(55) **Libocedrus Chilensis** Endlicher. (Chilean Cedar.)

It is wild in the mountain ranges of the Andes in Southern Chile. It was planted in the Lloyd Botanic Garden, Darjeeling, in 1914.

(56) **Libocedrus decurrens** Torrey. (Incense Cedar.)

This species which is distributed in the mountain forests of Lower California was introduced in the Lloyd Botanic Garden, Darjeeling in 1901, and Royal Botanic Garden, Peradeniya and Hakgala Garden, Ceylon, as early as 1885.

(57) **Libocedrus macrolepis** Bentham and Hooker.

This species which is sparsely distributed in the forests of the hills of Southern Yunnan, China, was introduced in the Lloyd Botanic Garden in 1910 and is also believed to have been planted in the hills of North Burma.

(58) **Picea jezoensis** Carriere. (Yezo or Hondo Spruce.)

This species to which has been reduced *Picea ajanensis*, Fischer, is wild in North-East Asia and Japan. It has been growing in the Lloyd Botanic Garden, Darjeeling since 1904.

(59) **Picea Morinda** Link. (West Himalayan Spruce.)

It is wild throughout the Himalayan ranges and is available in the Lloyd Botanic Garden, Darjeeling, and forest areas of North-Western Provinces, Kashmir West and Assam.

(60) **Pinus canariensis** C. Smith. (Canary island pine.)

It is an indigenous tree of the Canary islands. It was planted in 1890 in Hakgala Garden, and in 1902 in the Royal Botanic Garden, Peradeniya, Ceylon.

(61) **Pinus caribæa** Morelet. (The Cuban Pine.)

This species which is found wild in south-east of United States, S. Carolina, Georgia and Florida, and also in Cuba and Honduras was planted in 1927 in the Royal Botanic Garden, Peradeniya, Ceylon.

(62) **Pinus contorta** Douglas. (Beach Pine.) *var.* **Murrayana.**

A native of the mountains of the Coastland of Pacific Ocean is said to have been planted in Ootacamond.

(63) **Pinus densiflora** Siebold and Zuccarini. (Red Pine of Japan.)

This is a common wild species of Japan. This was planted in the Lloyd Botanic Garden, Darjeeling in 1903.

(64) **Pinus excelsa** Wallich. (Bhutan Pine.)

This species which is distributed throughout the Himalayan ranges is available in the Lloyd Botanic Garden, Darjeeling (where it was grown in 1910); North-West Frontier Province; Ootacamond; Assam and Burma.

(65) **Pinus Gerardiana** Wallich. (Gerard's Pine.)

This species which is wild in the North-West Himalayas along the borders of Kashmir and Tibet from 5,000 to 13,000 ft. bears edible fruits.

(66) **Pinus halepensis** Miller. (Alepo Pine).

This species is a native of the country bordering the Mediterranean Sea such as Spain, Portugal, S.-E. France, Italy, Greece, Asia Minor, Cyprus and Algeria. It has been introduced in the Agri-horticultural Garden, Calcutta and Hakgala Garden, Ceylon, where it was planted in 1890.

(67) **Pinus Khasya** Royle. (Khasia Pine.)

This Khasia pine, a native of Assam and Upper Burma, was planted in the Lloyd Botanic Garden, Darjeeling in 1916.

(68) **Pinus Laricio** Poiret. (Corsican Pine.)

This species is a common indigenous plant of Southern Europe and is said to be under cultivation in Ootacamond.

(69) **Pinus longifolia** Roxburgh. (Long-leaved Indian Pine.)

This is the most widely distributed Indian Conifer of the valleys and mountain ranges from near the sea level up to over 7,000 ft. elevation. It is successfully grown nearly everywhere in this country. It is available in the Royal Botanic Garden, Calcutta, where several tall trees are doing well. It also grows in the Agri-horticultural Garden, Calcutta, and was planted in 1885 in the Hakgala Garden, Ceylon. It is fairly common in the North-West Frontier Province, Kashmir, Northern India, Lahore, Ootacamond, Udaipur, Central Provinces, Bihar, Madras, Assam and Upper Burma.

(70) **Pinus Massoniana** Lambert. (Mason's Pine.)

This is a South-East Chinese pine imported in the Hakgala Garden, Ceylon in 1885.

(71) **Pinus Merkusii** Jungh and de Vriese. (Tenasserim Pine.)

This is one of the most tropical of all pines occurring in Burma, Martaban, Upper Tenasserim, Siam, Java, Cochin China, Borneo, Sumatra, and Philippine Islands. It was planted in 1927 in the Royal Botanic Garden, Peradeniya.

(72) **Pinus Montezumæ** Lambert. (Rough branched Mexican Pine.)

This species, a native of Mexican mountains, has been growing in the Hakgala Garden, Ceylon.

(73) **Pinus monticola** Don. (Western White Pine.)

This species having a long range of distribution along the Pacific Coastland of North America from South British Columbia extending to the mountains of Sierra Nevada in California reaching up to an elevation of about 10,000 ft., was introduced in the Lloyd Botanic Garden, Darjeeling in 1922.

(74) **Pinus moraiensis** Siebold and Zuccarini.

A specimen of this plant planted in 1911 is still growing in the Lloyd Botanic Garden, Darjeeling.

(75) **Pinus muricata** D. Don. (Bishop's Pine.)

This species which is confined to the coast of California, was introduced in the Hakgala Garden, Ceylon in 1891.

(76) **Pinus parviflora** Siebold and Zuccarini. (Japanese White Pine.)

It is one of the common trees of the forests of the mountains of Japan and Kurile Islands. This tree has been growing in the Lloyd Botanic Garden, Darjeeling since 1912.

(77) **Pinus Patula** Schlechtendal and Chamisso. (Spreading-leaved Pine.)

This species wild in the Central and Eastern Mountains of Mexico was planted in 1910 in the Lloyd Botanic Garden, Darjeeling.

(78) **Pinus Pinea** Linnæus. (Stone Pine.)

It is wild all along the Mediterranean region and was introduced in 1894 in the Hakgala Garden, Ceylon.

(79) **Pinus radiata** D. Don. (Monterey Pine.)

This is indigenous to Monterey country, California, and was introduced as early as 1868 in the Royal Botanic Garden, Peradeniya. It is also under cultivation in Ootacamond and Madras.

(80) **Pinus sinensis** Lambert. (Chinese Pine.)

This species, which is found in wild state in Central, Western China, Northern China and Corea, is available in the Royal Botanic Garden, Peradeniya, and is as old as 47 years.

(81) **Pinus sylvestris** Linnæus. (Scott's Pine.)

This species, one of the common pine occurring in natural state all over Europe and Western and Northern Asia, is available in the Lloyd Botanic Garden, Darjeeling, where it was imported in 1902.

(82) **Pinus Thunbergii** Parlatore. (Black Pine.)

This Japanese Black Pine has been grown in the Lloyd Botanic Garden, Darjeeling since 1912.

(83) **Podocarpus elatus** Brown. (Brown's Pine.)

This species, a native of New South Wales and South Queensland, was introduced in the Royal Botanic Garden, Peradeniya, as early as 1873.

(84) **Podocarpus elongatus** L'Héritier.

It is a native of the Western parts of South Africa which was planted 40 years ago in Dehra Dun. It has also been introduced in the Agri-horticultural Garden, Calcutta and Ootacamond.

(85) **Podocarpus falcatus** R. Brown. (Oteniqua Yellow Wood.)

This species, a native of Cape Colony, Natal, and the Transvaal has been grown in Dehra Dun.

(86) **Podocarpus gracilior** Pilger. (Musengera.)

It is distributed in Abyssinia, Uganda and Kenya and has been growing in the Royal Botanic Garden, Calcutta and Peradeniya, Ceylon since 1927. It has also been introduced in Dehra Dun.

(87) **Podocarpus imbricatus** Blume.

To this species has been reduced *Podocarpus cupressina*, R. Brown, which is indigenous to Burma, North British Borneo, Java, and Philippine Islands. It is frequently met with in Upper Burma and was introduced in 1880 in the Hakgala Garden, Ceylon.

(88) **Podocarpus latifolius** R. Brown. (Real Yellow Wood.)

It grows wild in South Africa and was introduced in 1900 in the Royal Botanic Garden, Peradeniya, Ceylon; Assam; Tinnevalley District, Madras and Upper Burma.

(89) **Podocarpus littoralis** Hort.

It was introduced in 1921 in the Royal Botanic Garden, Peradeniya, Ceylon.

(90) **Podocarpus macrophyllus** D. Don.

This species, wild in China and Japan and sometimes used as hedge plant there, was introduced in 1891 in the Royal Botanic Garden, Peradeniya and Hakgala Garden, Ceylon. This plant is sometimes used for hedges and stands pruning.

var. **Maki.**

This variety has been under cultivation in the Royal Botanic Garden, Calcutta; Agri-horticultural Garden, Calcutta; Lahore; Ootacamond; and the Royal Botanic Garden, Peradeniya, Ceylon where it was introduced as early as 1808.

var. **albo-variegatus.**

This variety was planted in 1921 in the Royal Botanic Garden, Peradeniya and Hakgala Garden, Ceylon. The *var. variegata* of the Ceylon gardens evidently refers to the above variety characterised by silvery variegated leaves.

(91) **Podocarpus Nagi** Makino (Nageia).

This tree, wild in Japan, China and Formosa, is much used for dwarfing purposes as a pot plant, and has recently been introduced in the Agri-horticultural Garden, Calcutta.

(92) **Podocarpus neriifolius** D. Don. (Thitmin.)

This is the most common wild Podocarpus of the Himalayas extending down to Borneo, Java, and the Andaman Islands. Almost full sized plant is found in the Royal Botanic Garden, Calcutta, Lower Burma and Assam. This has been introduced fifteen years ago in Dehra Dun. It has got some timber value.

(93) **Sequoia sempervirens** Endlicher. (Californian Red wood).

This tree which sometimes attains a height of about 340 ft. in South California is perhaps the tallest tree in the world. A specimen has been growing since 1887 in the Hakgala Garden, Ceylon. The wood is used for various useful purposes.

(94) **Taxodium distichum** Richards. (Deciduous Cypress.)

This is one of the most graceful conifers occurring in wild state from Florida to Mexico. It grows well in the plains and beautiful specimens can be seen in the Royal Botanic Garden, Calcutta, Lloyd Botanic Garden, Darjeeling where it was planted in 1895. It is also found growing in Ootacamond and Lahore.

var. **mucronatum.** (Mexican Cypress.)

This variety which is confined to Mexico and sometimes in some parts forms a more or less pure association is available in the Royal Botanic Garden, Calcutta; Lloyd Botanic Garden, Darjeeling (where it was introduced in 1901); Agri-horticultural Garden, Calcutta and it has recently been planted in Dehra Dun.

(95) **Taxus baccata** Linnæus. (Common Yew.)

This species which has wide range of distribution, occurring wild in Europe, North Persia and Algeria flourishes in natural state in the Himalayan ranges from Afghanistan to Bhutan. It is available in the Lloyd Botanic Garden, Darjeeling; North-West Frontier Province; Kashmir; Ootacamond; Assam and is also said to occur in Burma.

(96) **Tetraclinis articulata** Masters. (Alerce).

This species, indigenous to Algeria Mogador, Morocco, and Malta, has recently been introduced in Dehra Dun, North-West Frontier Province, and the Punjab. *Callitris quadrivalvis* Vent is a synonym of *T. articulata* Masters. A fine specimen of this species is found growing in the Punjab University Botanic Garden.

(97) **Thuja dolabrata** Linnæus. (Hiba.)

One of the important Japanese forest trees. It was introduced in 1885 in the Lloyd Botanic Garden, Darjeeling. It is under cultivation in Ootacamond too.

(98) **Thuja japonica** Maximowicz. (Japanese Arbor-vitae.)

This species, wild in the hills of Central Japan, was planted in 1905, in the Lloyd Botanic Garden, Darjeeling.

(99) **Thuja occidentalis** Linnæus. (American Arbor-vitae.)

It is a native of the Eastern, North America and has been grown in Ootacamond, Gwalior, and North Burma. It has been growing in the Lloyd Botanic Garden, since 1902 and in the Hakgala Garden since 1885.

(100) **Thuja orientalis** Linnæus. (Chinese Arbor-vitae.)

This is the most widely cultivated species of Conifers growing everywhere but occurring wild in Northern and Western China. It is grown as an ornamental plant all over India. In Bengal it is available in the Agri-horticultural Garden, Calcutta and in the Royal Botanic Garden, Calcutta, where it must have been introduced during East India Company's time, very likely by Wallich in 1812, and was perhaps subsequently distributed elsewhere. It is at present frequently met with in almost all the gardens throughout India and Burma. It was grown in the Royal Botanic Garden, Peradeniya and Hakgala Garden, Ceylon from 1885. It occurs also in the Lloyd Botanic Garden, Darjeeling; Lahore; Gwalior and various parts of this country. J. S. Gamble collected specimens of this species from Darjeeling in 1897. In 1857, this plant was found in the Nilgiri hills in Southern India.

var. **aurea.**

This variety has been growing in the Lloyd Botanic Garden, Darjeeling since 1904 and has recently been planted in Lahore.

var. **compacta.**

It was introduced in the Lloyd Botanic Garden, Darjeeling in 1901 and has recently been planted in the Victoria Garden, Bombay.

var. **elongatissima.**

This was planted in the Lloyd Botanic Garden, Darjeeling in 1913.

var. **semperaurescens.**

It was introduced as early as 1885 in the Royal Botanic Garden,. Peradeniya and Hakgala Garden, Ceylon.

var. **aurea-variegata.**

This was planted in 1890, in the Lloyd Botanic Garden, Darjeeling.

(101) **Thuja plicata** D. Don. (Western Arbor-vitæ.)

A valuable timber tree of Western, North America, extending from sea level to the elevation of 6,000 ft. This specimen was introduced in the Lloyd Botanic Garden, Darjeeling during 1900-1901 ; Gwalior.

(102) **Tsuga Brunoniana** Carriere. (Himalayan Hemlock.)

An indigenous plant extending throughout the Eastern and Western Himalayan ranges is available in the Lloyd Botanic Garden, Darjeeling and has been planted in Assam too.

(103) **Tsuga yunnanensis,** Masters. (Yunnan Hemlock.)

This species, wild in Yunnan and West Szechuen, is grown in Northern Burma.

(104) **Widdringtonia cupressoides** Endlicher. (Sapree wood.)

This shrub which is confined to the Table Mountain range has recently been planted in Dehra Dun.

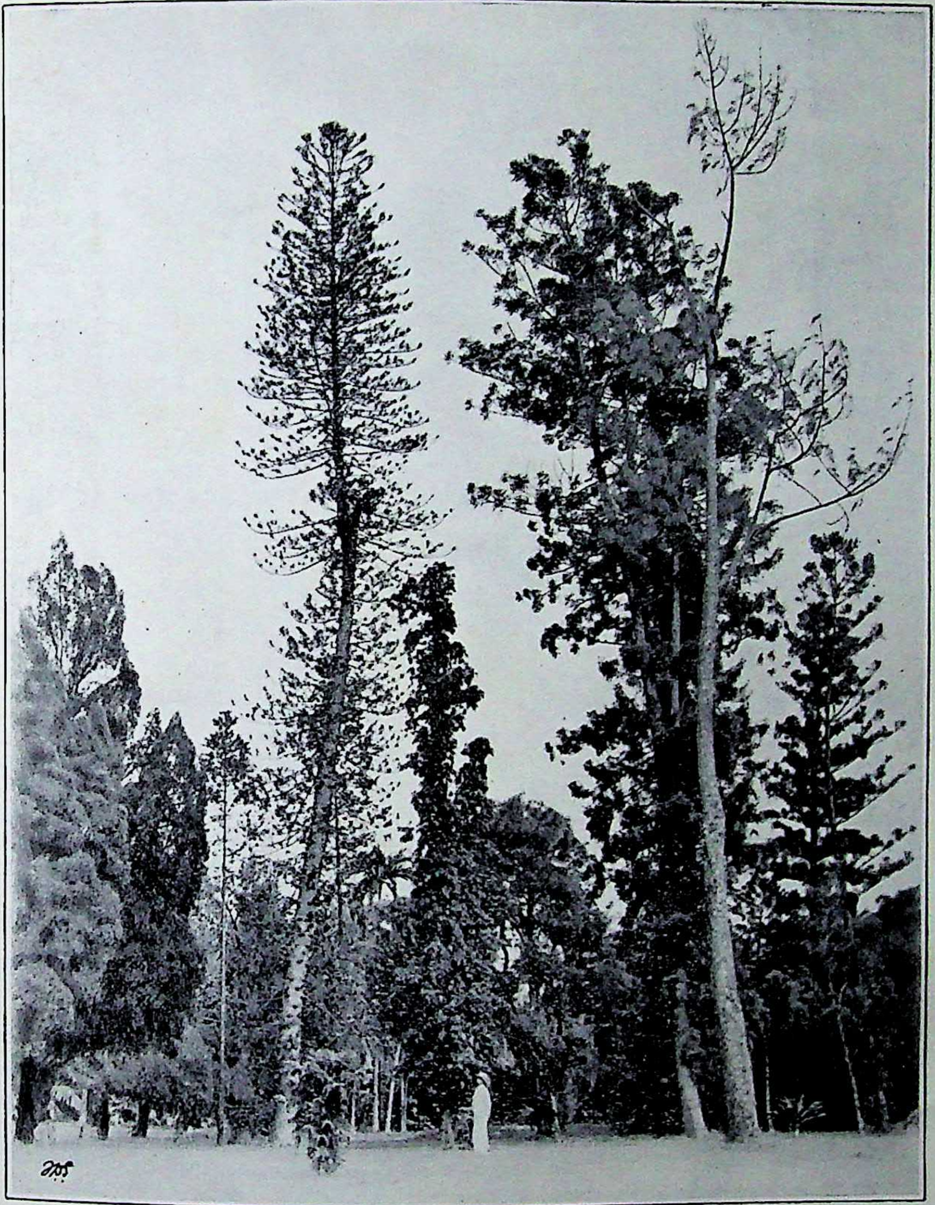
(105) **Widdringtonia juniperoides** Endlicher. (Clanwilliam Cedar.)

This tree is a native of the forest area of Cedarberg Mountains and has been introduced in Dehra Dun.

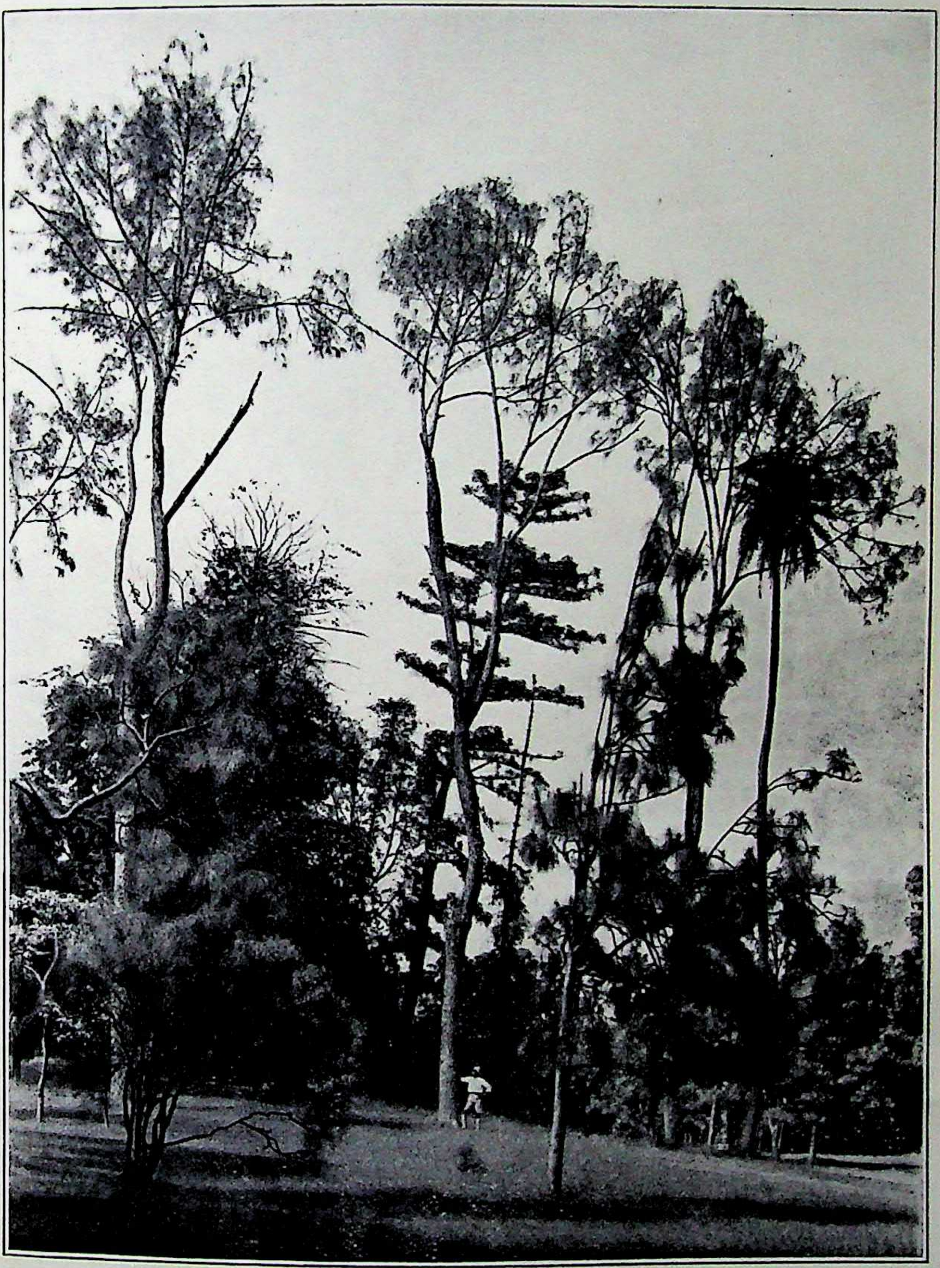
(106) **Widdringtonia Whytei** Rendle. (Milanji Cedar.)

This cedar of Milanji Mountains has recently been planted in Dehra Dun and Ootacamond.

Herbarium,
Royal Botanic Garden,
Calcutta, the 15*th May*, 1933.



A group of Conifers in the Royal Botanic Garden, Calcutta. (Left to right) – in the foreground—*Araucaria excelsa* (about 3 years old). In the background—*Juniperus chinensis* with mostly needle leaves and scale leaves mixed up at the base. *Juniperus chinensis* with needle leaves at the base but mostly all scale leaves above, due perhaps to its being in more shady part. *Agathis loranthifolia; Cupressus funebris; Araucaria Cunninghamii; Podocarpus neriifolia; Pinus longifolia; Araucaria excelsa. Juniperus chinensis*—(all needle leaves).



A group of Conifers in the Royal Botanic Garden, Calcutta. In the foreground—*Pinus longifolia*. In the background—*Araucaria Cunninghamii* and *Araucaria Bidwillii*.

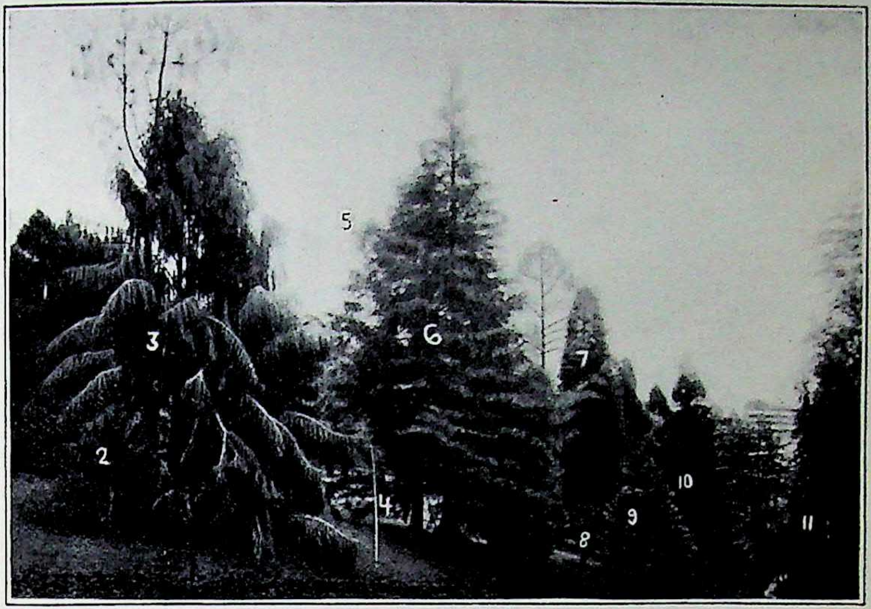


FIG. 1. Conifers under cultivation in the Lloyd Botanic Garden, Darjeeling. (Left to right)—(1) *Thuja orientalis*, (2) *Taxus bacata*, (3) *Picea Morinda*, (4) *Larix Griffithii*, (5) *Cupressus Goveniana*, (6) *Cedrus Deodara*, (7) *Cryptomeria japonica*, (8) *Juniperus recurva*, (9) *Cupressus lusitanica* var. *Benthami*, (10) *Abies balsamea*, (11) *Cupressus macrocarpa*.

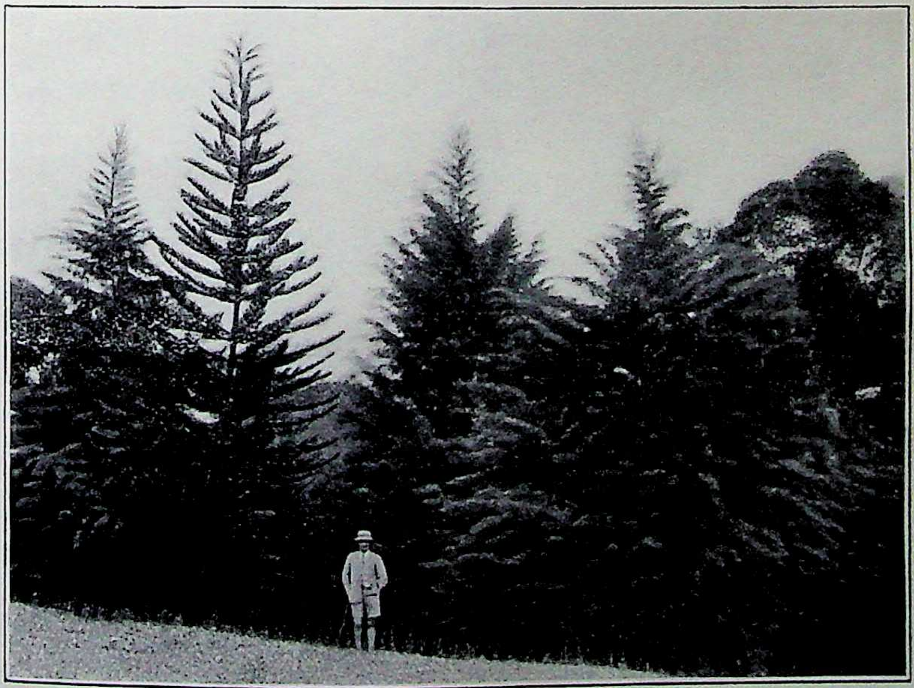


FIG. 2. Another view of the group of Conifers growing in the Royal Botanic Garden, Peradeniya, Ceylon. (Left to right)—*Cupressus macrocarpa*, (11 years old); *Araucaria Cookii*, (11 years old); *Cupressus macrocarpa*, (11 years old); *Cupressus Lindleyii*, (11 years old).

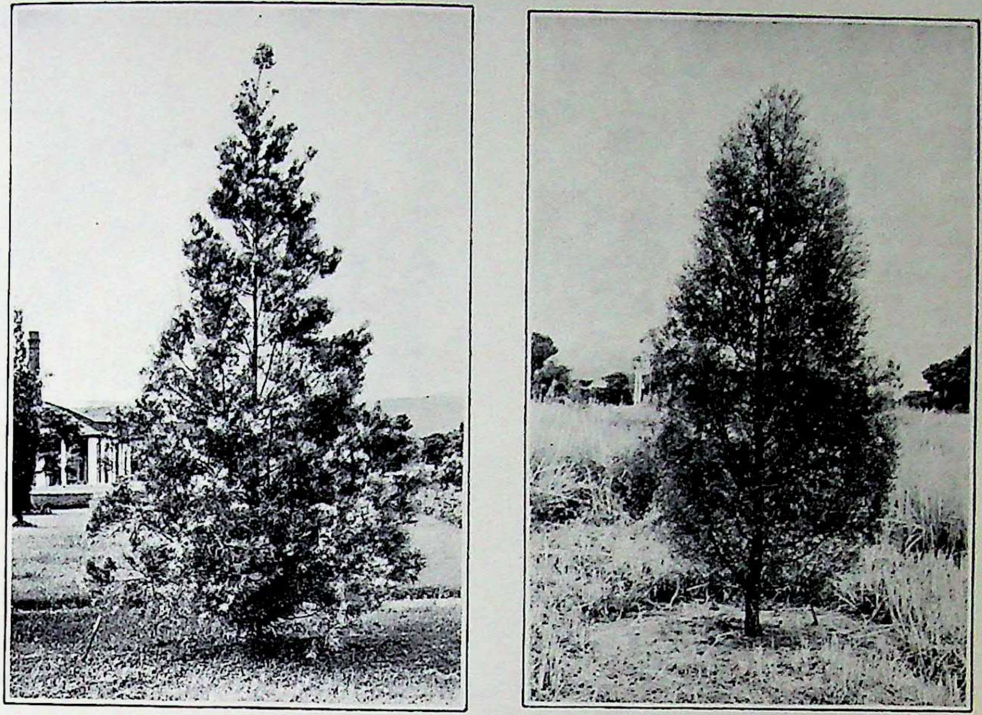


FIG. 1. Conifers under cultivation in the arboretum, New Forest, Dehra Dun. (Left) *Podocarpus gracilior*, (8 years old, 13 ft. in height); (Right) *Tetraclinis articulata*, (5 years old, 9 ft. in height).

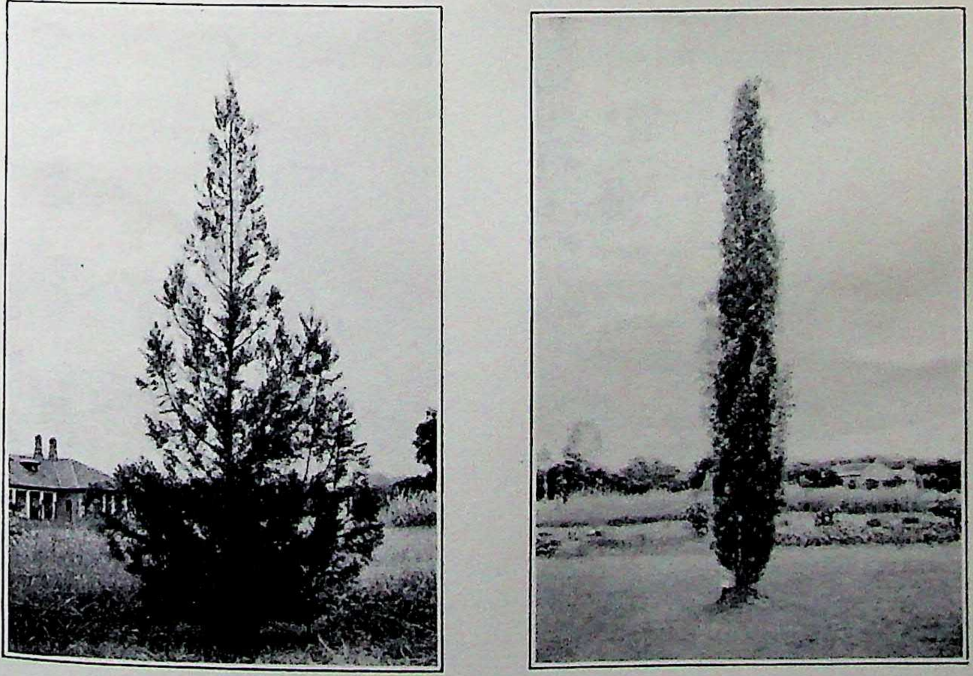


FIG. 2. Conifers under cultivation in the arboretum, New Forest, Dehra Dun. (Left) *Juniperus procera*, (8 years old, 16 ft. in height); (Right) *Callitris glauca*, (7 years old, 25 ft. in height).

PLATE 22.

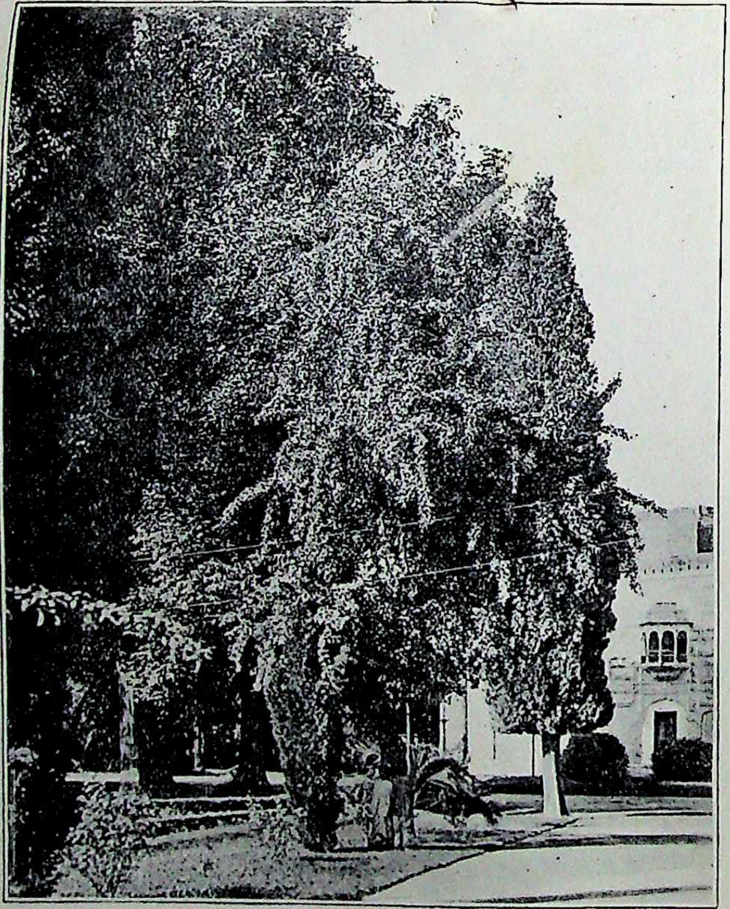


FIG. 1. The tallest cultivated Indian specimen of *Ginkgo biloba* at Rambag, Amritsar. The two men are standing near the tree. In the background on the left there is a large tree of *Thuja occidentalis*.

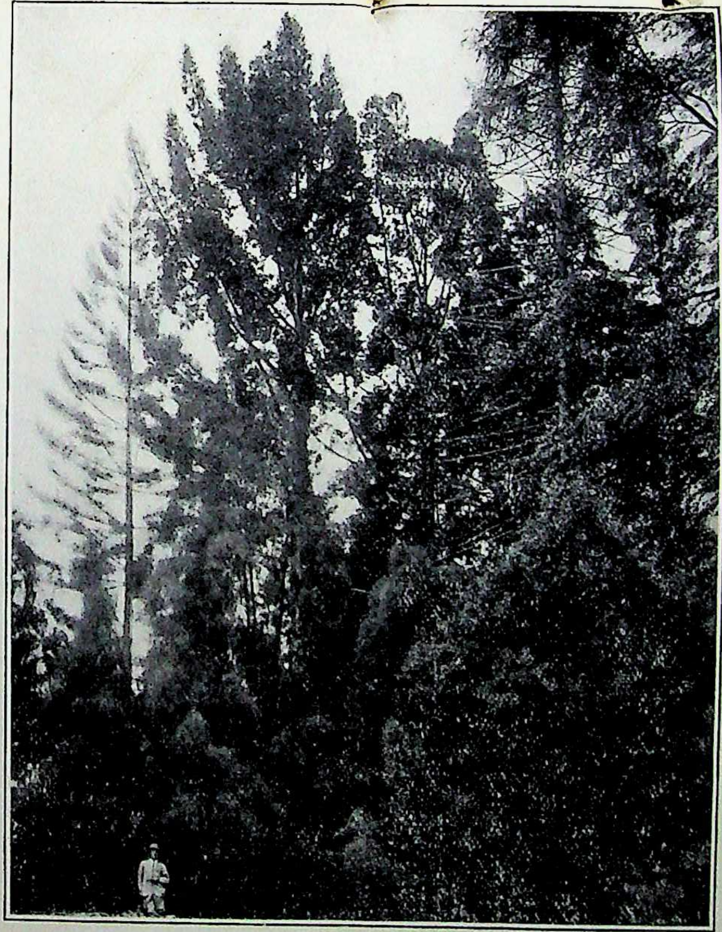


FIG. 2. A group of Conifers in the Royal Botanic Garden, Peradeniya, Ceylon. (Left to right)—*Araucaria Cunninghamii*, (11 years old); *Agathis rubusta*, (25 years old); *Araucaria Bidwillii*, (25 years old); *Juniperus procera*, (9 years old); *Podocarpus littoralis*, (10 years old).

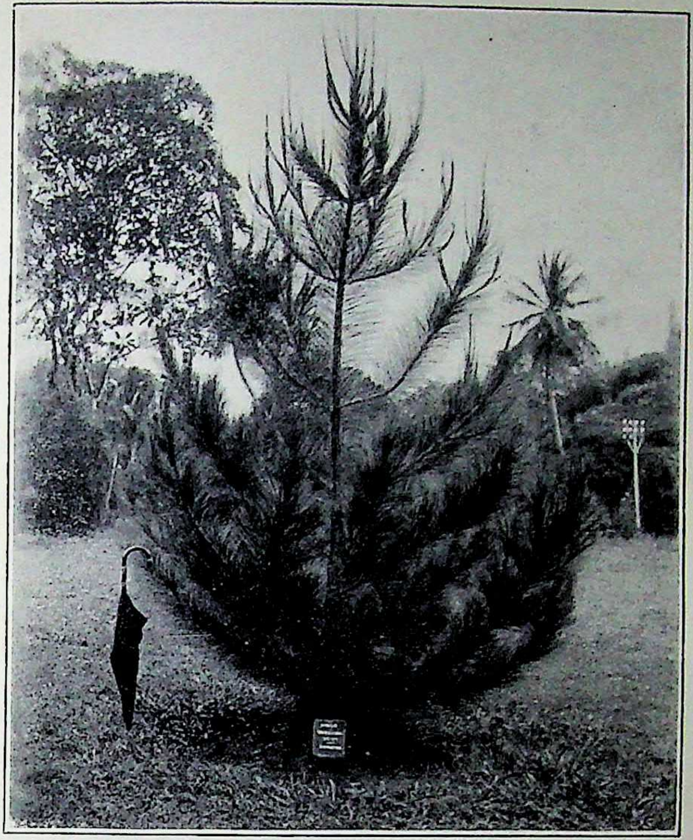


FIG. 1. Conifers under cultivation in the Royal Botanic Garden, Peradeniya, Ceylon. *Pinus Merkusii*. (4 years old).

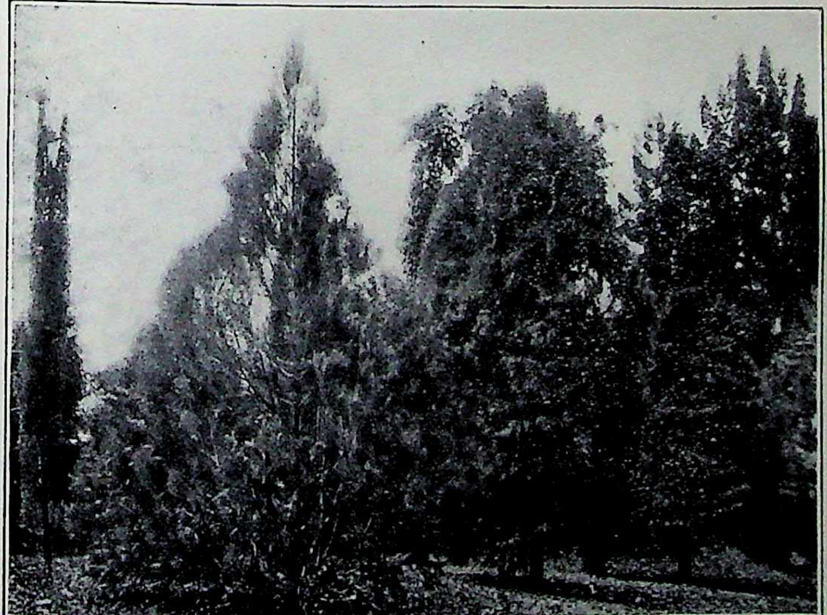


FIG. 2. A group of Conifers growing in the Royal Botanic Garden, Peradeniya, Ceylon. (Left to right)—*Araucaria Cunninghamii*, (11 years old); *Cupressus sempervirens* var. *stricta*; *Thuja orientalis*, (11 years old); *Juniperus procera*, (11 years old); *Cupressus Lindleyii*, (11 years old); *Agathis robusta*.

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Proceedings
# of the
Asiatic Society of Bengal
for 1931.

[*Journal and Proceedings of the Asiatic Society of Bengal.*]

Proceedings, Asiatic Society of Bengal, 1931.

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PROCEEDINGS OF THE ANNUAL MEETING, 1932.

The Annual Meeting of the Asiatic Society of Bengal was held on Monday, the 1st February, 1932, at 5-30 P.M.

PRESENT :

HIS EXCELLENCY, COLONEL THE RIGHT HON'BLE SIR FRANCIS STANLEY JACKSON, P.C., G.C.I.E., Governor of Bengal, Patron.

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Seth, Mr. M. J.
Shirazi, Aga Mohd. Kazim
Siddiqi, Dr. M. Z.
Tyson, Mr. J. D.
Ukil, Dr. A. C.
Wadia, Mr. D. N.
Watson, Mr. A. H.
Winfield, Rev. W. W.

and many others.

Visitors :

Banarsilall, Mr.
Banerji, Mr. Narayan Chandra
Baryda, Mr. P.
Bhose, Mr. S.
Bhattacharya, Mr. G.
Bhattacharya, Mr. Harisatya
Bhattacharya, Mr. N.
Bogdanov, Mr. L.
Boven, Mr. J. van
Boven, Mrs.
Brahmachari, Mr. Bhabataran
Brahmachari, Mr. Nirmal Kumar
Brahmachari, Mr. Phanindra Nath
Brahmachari, Mr. Shama Charan
Brinkman, Mr. F. L.
Browne, Major H.
Burges, Dr. P. A.
Chatterji, Mr. Harisadhan
Chatterji, Mrs. S. K.
Cleghorn, Miss O.
Chukerbutty, Mr. K.
Danjou, Mons. F. A.
Danjou, Mrs.
Darbari, Mr. M. K.
Darbari, Mrs.
Dodd, Rev. G. E.
Dodd, Mrs.
Eldering, Mr. J. E.
Field, Miss F. J.
Frost, Mr. A. C.
Ganguly, Mr. N.
Ghatak, Mr. N.
Ghose, Mr. D. C.
Ghose, Mr. D. C.
Ghose, Mr. H. L.
Ghose, Mr. S. C.
Ghosh, Mr. A.
Ghosh, Mrs.
Ghosh, Mr. R.
Giel, Mrs.
Gordon, Mr. T. V.
Gubbay, Mr. M.
Gubbay, Mrs.
Haque, Md. Sadul
Hildebrand, Mr. M.
Jackson, Mrs. P. S.
Jafferey, Mr. W. A.
Kastengren, Mr. Martin
Khaitan, Mr. K. P.
Khan, M. Abdul Wahid
Knight, Rev. P.
Lawton, Mrs.
Long, Mr. A. D.
Lort-Williams, Mrs.
Mahadeo, Mr.
Mahboob Alam, Sahebzada Md.
Majumdar, Mr. N. G.
McKerrow, Mr. J. A.
Mitra, Mr. M.
Mookerjee, Dr. H. K.
Nemenyi, Dr. L.
Paul, Mr. K. S.
Proctor, Lt.-Col. A. H.
Ratcliffe, Mr. R. A.
Ray, Dr. H. N.
Sen, Mr. A.
Sen, Mr. Boshi
Sen-Gupta, Mr. J.
Setna, Mr. D. R.
Shaha, Dr. B.
Sharma, Mr. M. R.
Sharma, Mr. S. K.
Sinha, Mr. Ram Kamal
Stanley, Mrs. F.
Stewart, Capt. F.
Strick, Mrs.
Tyson, Mrs.
Tyson, Mrs. J. D.
West, Mr. W. D.
Williamson, Mr. L. A.
Williamson, Mrs. L. A.

and many others.

The President ordered the distribution of the voting papers for the election of Officers and Members of Council for 1932, as well as the voting papers for the election of Ordinary Fellows proposed by the Council, and appointed Dr. S. L. Hora and Major B. G. Mallya to be scrutineers.

The Annual Report was then presented. (See page lvi.)

At 5-55 P.M., the President vacated the Chair, and invited Lt.-Col. R. N. Chopra to occupy it during his absence from the room.

The President, the Treasurer, and the General Secretary then left the meeting room to receive His Excellency, Colonel the Right Hon'ble Sir Francis Stanley Jackson, Governor of Bengal, Patron of the Society, at the entrance of the building.

On the arrival of the Patron at 6 P.M., the President introduced the Council to him, and after a brief word of welcome invited him to occupy the chair.

After his installation in the chair, the Patron called on the retiring President to read his Annual Address.

The retiring President then addressed the meeting. (See page x.)

The retiring President then called upon the scrutineers to report, and announced the result of the Council election. (See page xlvi.)

The retiring President then gave place to the President for 1932, who thanked the Society briefly as follows :—

'YOUR EXCELLENCY, LADIES, AND GENTLEMEN,

I thank you for the honour that you have conferred upon me this evening by electing me to the Presidential chair of the Asiatic Society of Bengal. The Asiatic Society, in my opinion, is the most distinguished academy of learning in the Eastern Hemisphere and although I have no pretensions to learning, I feel proud to occupy the chair of so many distinguished men in the past. I thank you once more and I have nothing further to add at the present moment except to state that it will be my aim and endeavour to serve the Asiatic Society of Bengal to the utmost of my power and ability.'

The President for 1932 then invited the Patron, His Excellency the Governor of Bengal, to address the meeting.

The Patron then addressed the meeting. (See page xlii.)

After the reading of the Patron's address, the President thanked the Patron in the following words :—

'YOUR EXCELLENCY, LADIES, AND GENTLEMEN :—

The very first duty which an incoming President has to perform immediately after the delivery of the address by His Excellency the Patron of our Society and which is of an agreeable nature, is to propose a hearty vote of thanks to His Excellency for having taken the trouble to come among us this evening and for the learned and instructive address that he has just delivered. His Excellency did not come as a stranger to Bengal when he came out as Governor of Bengal, for His Excellency had visited this Presidency during the Lieutenant-Governorship of Sir Charles Elliott and had acquainted himself with what India is. During his five years' stay amongst us His Excellency has extended to us uniform courtesy and we have received nothing but encouragement and consideration from him. This Society and the Presidency will be the poorer by His Excellency's departure, but wherever he may be he can count upon our good wishes and on our part we have no doubt that the Society and its activities will never be forgotten by His Excellency, and that should occasion arise he will not fail to extend to us the same encouragement and consideration as heretofore. I ask you, Ladies and Gentlemen, to signify your assent to my proposal by carrying this vote by acclamation.'

The vote of thanks having been adopted by acclamation, the President made the following announcements :—

I have now great pleasure in announcing that, having heard the report of the scrutineers, I declare the following Ordinary Member

Monsieur Jacques Bacot

duly elected an Ordinary Fellow of the Asiatic Society of Bengal.

I have next to announce that papers from two candidates have been received in competition for the Elliott Prize for Scientific Research for the year 1931, and the Trustees have judged the papers of one candidate deserving of the prize.

The Elliott Prize for the year has accordingly been awarded to Mr. T. C. N. Singh, at present of Cuttack, for meritorious contributions to the subject of Plant Biology.

The prize for 1932 will be for Mathematics, regarding which a detailed announcement will be published in the *Calcutta Gazette* and the *Bihar and Orissa Gazette*.

My next announcement regards the Barclay Memorial Medal. This medal is awarded each alternate year for conspicuously important contributions to Medical or Biological Science with special reference to India. This year the medal is awarded to Lt.-Col. R. B. Seymour Sewell, I.M.S., Director, Zoological Survey of India, whom we all know as our President for the last two years and the Director during the last few years of the Zoological Survey of India. He started his scientific career as a medical man coming out to India as a member of the Indian Medical Service. Soon after he was appointed Surgeon-Naturalist, R.I.M., and during the War resumed his medical duties. After the War he reverted to his scientific work. Colonel Sewell was President of the Asiatic Society of Bengal, President of the Indian Science Congress, and a member of several Scientific Committees. His three great works are a series of papers on the Oceanography and Meteorology of the Indian Ocean, a brilliant paper on the Cercariæ Indicæ and a comprehensive monograph on the Copepoda of which the first part has already been published, the second is practically finished, and the third is still under preparation.

We have no hesitation in saying that the list of brilliant names furnished by the roll of recipients of the Barclay Memorial Medal has been worthily continued by the inclusion therein of that of Colonel Sewell.

The President then made the following announcement regarding the Paul Johannes Brühl Memorial Medal :—

The Paul Johannes Brühl Memorial Medal is awarded every three years for conspicuously important contributions to the knowledge of Asiatic Botany.

This medal has been lately instituted in memory of Paul Johannes Brühl, a distinguished Botanist and Teacher in Calcutta, and for many years an active member and Council Member of the Asiatic Society of Bengal. The first award is made to the Reverend Ethelbert Blatter, of the Society of Jesus, for many years a Professor of Botany, St. Xavier's College, Bombay. The Reverend Father Blatter is amongst the distinguished scholars which his fraternity has produced since its inception and his life-long service to the cause of botany is universally known. He was a President of the Botanical Section of the 13th Indian Science Congress, and contributed to the Society's Journal an important description of new species of Indian plants. His books on the Palms of British India and Ceylon, on the Ferns of Bombay and on the Beautiful Flowers of Kashmir are standard works, whilst his contributions to botanical literature, amongst which are a useful Flora Arabica and Flora of Aden and the Desert Flora of the Indus Delta, have been numerous and important.

We congratulate ourselves that the new list of Medallists has been inaugurated by so distinguished a name.

After these announcements, the President declared the Annual Meeting to be dissolved with the following words :—

Ladies and Gentlemen, in declaring the Annual Meeting dissolved I invite the non-members present to examine a collection of exhibits at the other side of the hall, and the members present to re-assemble around this table for an Ordinary Monthly Meeting for the election of Members and the transaction of business.

After this final announcement, the Presidents for 1931 and 1932 conducted the Patron, to inspect a series of Portraits of former Presidents of the Society placed on the wall opposite the head of the staircase, and the exhibits. (For a descriptive list of the exhibits, see page xlvii.)

At 7 P.M., the Patron left the meeting, conducted by the President for 1932, after which an Ordinary Monthly Meeting was held for the transaction of business by members, whilst the visitors inspected the exhibits.

* * *

ANNUAL ADDRESS, 1931-32.

YOUR EXCELLENCY, LADIES, AND GENTLEMEN,

It is with feelings of great sadness that I rise to address you at this Anniversary Meeting of the Society. Col. Sewell, our President for the last year, left us suddenly at the news of his wife's serious illness but reached home too late to see her before she passed away. We express our deep sense of sorrow to him in his great bereavement.

It is also my painful duty to refer to the death of Mahāmahopādhyāya Haraprasād Shāstrī. He was one of the oldest and most illustrious members of our Society. He made most valuable contributions to our publications and worked in the interests of our Society up to the last day of his life. By his death we have suffered an irreparable loss. I hope we shall be able to perpetuate his memory in a suitable manner, though we know that

> 'We mortals are
> But mites and midges on a moss-grown star,
> Frail ephemerides that breed and crawl
> Among the middens of this festering ball.'

In Col. Sewell's absence the duty has fallen to me to address you at this annual meeting. I shall digress from the subjects of my profession and the special interests of my research, namely Medicine and Science, and choose as my theme:

SOME ASPECTS OF THE ASIATIC SOCIETY, PAST, PRESENT, AND FUTURE.

(*a*) Gleanings from the archives.
(*b*) Relations with the Indian Museum and the Scientific Surveys.
(*c*) Present and future finances of the Society.

THE ORIGIN OF THE SOCIETY: SIR WILLIAM JONES' CLASSICAL DISCOURSE: SOME ERRORS IN THE FIRST VOLUME OF THE *Asiatic Researches*.

I shall begin my subject by referring to Sir William Jones' voyage to India in April, 1783, in the frigate *Crocodile*, and his landing in Calcutta in September, 1783. In December of the same year he entered upon his judicial duties and soon after realised that the field of research in different subjects in India was of such an extent and nature as to baffle the industry of any one individual and that it could only be explored by the united efforts of many. With this idea he devised the institution of a Society in Calcutta in order to stimulate and facilitate the enquiries of the ingenious, to provide the means of preserving the numerous tracts and essays, which otherwise would be lost to the public, and to concentrate all the valuable knowledge which might be obtained in Asia. The suggestion was received with the greatest satisfaction by several persons to whom he communicated it and at a historic meeting of thirty gentlemen who represented the *élite* of the European Community of Calcutta, held at the Court House, Fort William, on Thursday, the 15th January, 1784, under the Presidency of Sir Robert Chambers, a Society was established under the name of the 'ASIATICK SOCIETY'. At this meeting Sir William Jones delivered his classical 'Discourse on the Institution of a Society for enquiring into the History, civil and natural, the Antiquities, Arts, Sciences, and Literature of Asia'. In the Discourse Sir William Jones referred to the train of reflections that were awakened in his mind, during his voyage to India, 'on the eventful histories and agreeable fictions of this Eastern World'.

It is difficult to make out how within a short period of only five years, after the delivery of the above speech, it was stated on page viii of the Introduction to the first volume of the *Asiatick Researches*, published in 1788, that *on 5th February*, 1784, *Sir William Jones delivered the above Discourse from the presidential chair of the Society.* This must be incorrect, unless it is held that he delivered his Discourse for a second time. But there is nothing in the records of the earliest proceedings of the Society to show that this was the case. This error has not been observed for more than one hundred and forty years.

At the same time there is no doubt that the idea of investigating those subjects mentioned in his Discourse was in his mind when he was on the high seas, as is evident from the memorandum written by himself during his voyage and which is reproduced in Lord Teignmouth's Memoirs of his life.

It was resolved immediately after the institution of the Society, to follow, as nearly as possible, the plan of the Royal Society of London, of which the King is the Patron and at the first meeting, it was therefore agreed to address Warren Hastings, the Governor-General, and the Members of the Council of Fort William in Bengal, explaining the objects of the Society and soliciting the honour of their patronage, which request was granted in the most flattering terms. The members of the Society next proceeded to the nomination of a president, and as Warren Hastings had distinguished himself as the first liberal promoter of useful knowledge in Bengal and especially as the great encourager of Persian and Sanskrit literature, they deemed him entitled to every mark of distinction, which it was in their power to offer and they determined to solicit his acceptance of the honorary title of president of the Society, as a just tribute of respect to his distinguished merit and position. Hastings declined the acceptance of the proffered title and a portion of his letter in which he expressed his inability to accept the presidentship is quoted below:—

> 'I have not the leisure requisite to discharge the functions of such a station, nor if I did possess it, would it be consistent with the pride which every man may be allowed to avow in the pursuit or support of the objects of his personal credit, to accept the first station in a department in which the superior talents of my immediate followers in it would shine with a lustre, from which mine must suffer much in the comparison and to stand in so conspicuous a point of view the only ineffective member of a body which is yet in its infancy, and composed of members with whose abilities I am, and have long been, in the habits of intimate communication, and know them to be all eminently qualified to fill their respective parts in it. On these grounds I request your permission to yield my pretensions to the gentleman whose genius planned the institution, and is most capable of conducting it to the attainment of the great and splendid purposes of its formation. I at the same time earnestly solicit your acceptance of my services in any way in which they can be, and I hope that they may be rendered useful to your Researches.'

There would be, therefore, seen to be an error in the record books of the proceedings of the Society, dated the 5th February, 1784, in which it is stated that Sir William Jones was requested to '*re-accept*' the office of president on this date.

The reputation of the Society was great from its very early days. The following lines dated the 2nd February, 1785, from the pen of William Marsden, author of the *History of the Island of Sumatra*, shows the high degree of esteem in which the Society was held so soon after its inauguration: 'If I may not be esteemed too presumptuous in the request, and if it not be inconsistent with the plan of your institution, I would respectfully solicit the distinguished honor of standing connected with your Society by the title of Member'.

Sir William Jones was President of the Asiatic Society up to April, 1794, and Sir John Shore succeeded him in May, 1794, after his death. The dates mentioned here are more accurate than those in the Centenary Review.

SIR ROBERT CHAMBERS: A MISSING PRESIDENT.
SIR C. E. GREY.

I would now refer to a letter written by me recently to our General Secretary, concerning a remarkable omission about one of the earliest presidents of the Society. In going through the Centenary Review of the Society (1784–1883), I found that the name of Sir Robert Chambers as one of the Presidents of the Society is not mentioned in the list of its presidents and that this omission has not been noticed for nearly fifty years. The fact was all the more striking since, as stated before, Sir Robert Chambers presided at the first meeting held for the institution of the Society. He succeeded Sir John Shore on the latter's resignation as president of the Society. The following extracts from the proceedings of the Society held on 4th January, 1798, are worth quoting: 'Mr. Harington, Vice-President, and the Secretary acquainted the Society that they had waited on Sir Robert Chambers pursuant to the direction given at the last meeting and that he accepted the office of president for the Society to which he had been elected expressing himself at the same time highly flattered with the honour the Society had conferred on him'. Chambers resigned his Presidentship on 10th January, 1799. His painted portrait is excellently preserved in the rooms of the Calcutta High Court.

THE PORTRAITS OF SOME EARLY PRESIDENTS.

Incidently, I may mention here that after having failed to find anywhere in Calcutta a portrait of Sir C. E. Grey, who was one of our past Presidents and for some time a Judge of the Supreme Court of Madras, and Chief Justice of Bengal, I requested the Librarian of the Imperial Library to enquire if the same was available in Madras High Court. He was informed by the Registrar, Madras High Court, that there was no record of any gentleman of that name as a Judge in the Supreme Court in Madras, though in a subsequent communication, he corrected his statement. Similarly in trying to trace the photograph of E. F. T. Atkinson, another President of the Society, from an album in the Society's Library, I found that this photograph, subsequently identified by me after comparison with another taken from a group photograph preserved in Delhi, has been recorded in the album as that of W. S. Atkinson, a former Secretary of the Society. Similarly again, in the Imperial Library, there is a group photograph in which E. C. Bayley, a former President of the Society, has been named E. S. Bayley. All these things suggest how quickly great men are forgotten and how true was the sentiment expressed in Tennyson's *In Memoriam* 'I care for nothing, All shall go.'

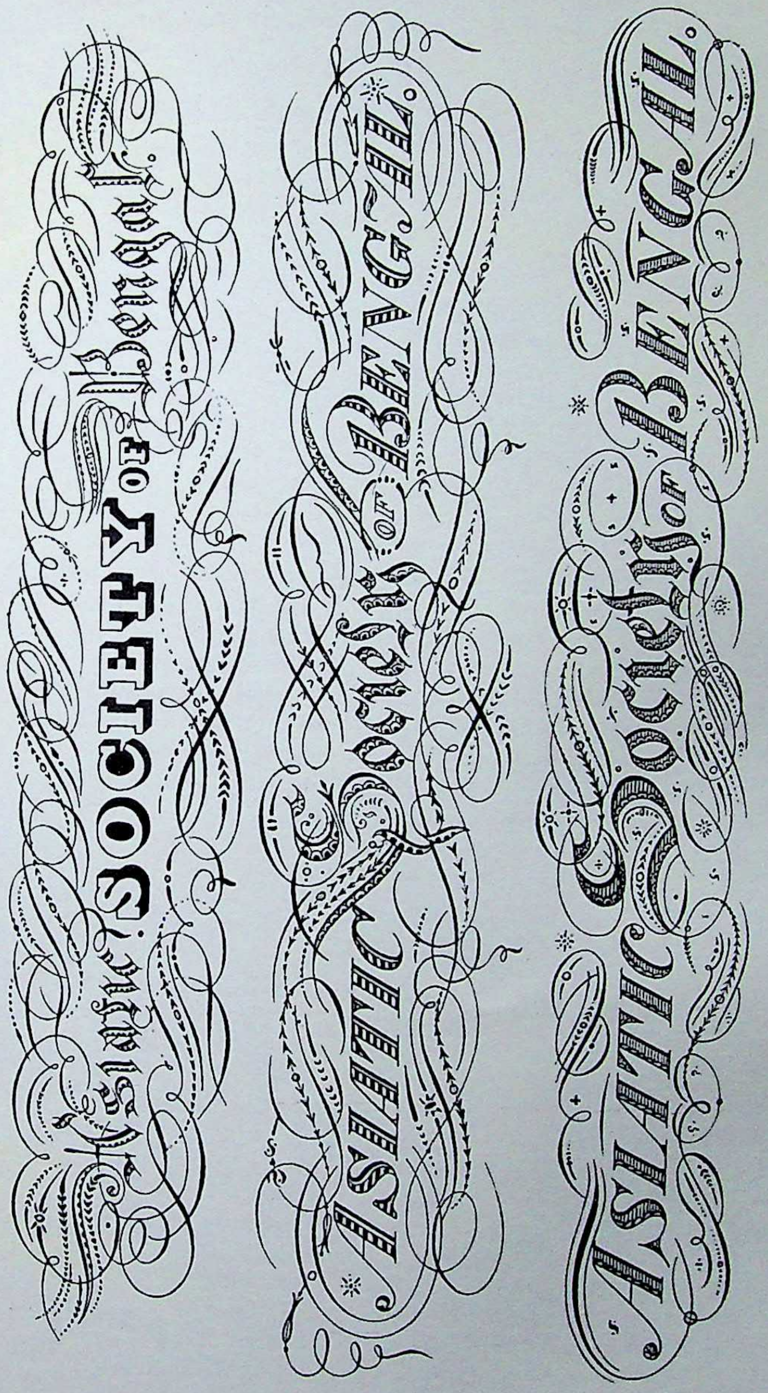
THE OBJECTS OF THE SOCIETY: SIR WILLIAM JONES' IDEA OF A RESEARCH MEDAL: SIR WILLIAM JONES' MEDAL FOR ASIATIC RESEARCHES.

The objects of the Society are frequently described in the following language: '*The bounds of its investigations will be the geographical limits of Asia, and within these limits its enquiries will be extended to whatever is performed by Man, or produced by Nature,*' or to express them in the words of Sir William Jones '*Man* and *Nature*; whatever is performed by the one, or produced by the other'.

But I consider that there was another object and that was to bring about good relationship between the Europeans, the Hindus, and the Mahomedans, and to strengthen it on an intellectual platform. On such a platform there could be no distinction of race or colour, of caste or creed but all races would meet for one common object, namely, the well-being of mankind. 'In the common-wealth of letters alone, can equality become subservient to the general benefit of mankind'.

That my view is correct is suggested by the vignette printed at the head of the paper which for some time the Asiatic Society formerly used for its letters. I am giving here a copy of this emblem from a letter which I have obtained from the archives of the Society, dated 18th September, 1838, addressed by Mr. James Prinsep, the Secretary of the Society, to the Committee of Papers of the Society. It represents the Vedas and a Mandir on one side and the Qoran and a Mosque on the other, and the bust of Sir William Jones in the centre. I have traced a second sample of this paper with the same emblem, but blank, in the archives of the Society.

I conceive that some such idea was in the mind of Sir William Jones when in his second anniversary Discourse on 24th February, 1785, he remarked that it might be advisable to print and circulate to learned Indians a short memorial in *Persian* and *Hindi* setting forth, in a style accommodated to the habits of Hindus and Mahomedans *the design of our institution.* I do not think that the design as shown in the vignette was executed in the times of Sir William Jones, as the Society is styled there Asiatic Society *of Bengal* and not Asiatick Society. It must have been therefore designed at the time when James Prinsep was the Secretary, who, it is admitted, added the words '*of Bengal*' to the name of the Society about 1832. There is an evident error in this emblem in which it is stated that the Society was instituted on 6th January, 1786. I ask for the privilege of presenting to the Society a block of this vignette along with blocks of three other letter heads discovered amongst the


Asiatic SOCIETY of Bengal
ASIATIC Society OF BENGAL
ASIATIC Society OF BENGAL

Three old letter heads of the Asiatic Society of Bengal.

correspondence of the Society dating from about the time of James Prinsep, to be preserved in his memory.

In the same second Discourse, Sir William Jones made the suggestion of bestowing a medal annually with an inscription in *Persian* on one side and in *Sanskrit* on the reverse, as a prize of merit, to the writer of the best essay or dissertation on Asiatic Researches. Mr. Gilchrist, one of the members of the Society, suggested at the meeting of the Society held on the 6th December, 1798, that the best essay, on the several topics published by the Society, should entitle the authors to an appropriate medal with suitable inscription and device. More than one hundred and forty years had passed since the foundation of the Society, before a donation was made to the Asiatic Society in 1926 for the creation of an endowment for the award of a medal in the name of Sir William Jones for Asiatic Researches. It has the bust of Sir William Jones on one side and the words 'Awarded for Asiatic Researches' on the other. I feel happy that the Society has accepted this donation from a sincere well-wisher of the Society. Let us hope that it may be possible to create, one day, Sir William Jones' Fellowships, Readerships and Professorships under the auspices of the Asiatic Society of Bengal, through the munificence of some great benefactor.

APPLICATION OF THE SOCIETY TO HIS MAJESTY THE KING OF ENGLAND TO OBTAIN A ROYAL CHARTER OF INCORPORATION OF THE SOCIETY: THE REFUSAL OF THE SOCIETY TO BE INCORPORATED WITH THE ROYAL ASIATIC SOCIETY OF GREAT BRITAIN AND IRELAND.

On the 29th September, 1796, under the presidency of Sir John Shore, the Society wrote a letter to the Governor-General in Council requesting that he might be pleased to solicit the Hon'ble the Court of Directors to take such measures as might be required to obtain His Majesty's Letters Patent, constituting the Society under the title of Asiatic Society, vesting in them and their successors the Rights and Privileges usually granted to such literary bodies. The request was complied with by the Governor-General in Council, and in the letter from the Secretary to the Government dated Council Chambers, the 3rd October, 1796, to the Society, it was stated the Governor-General in Council would have great pleasure in communicating the request to the Hon'ble Court of Directors with the recommendation that they should comply with it. I have not discovered from the records of the Society what was the final decision concerning this proposed Royal Charter. The Society, however, was requested in 1829 by the newly constituted Royal Asiatic Society of Great

Britain and Ireland to incorporate itself with the latter, but the Asiatic Society of Bengal declined.

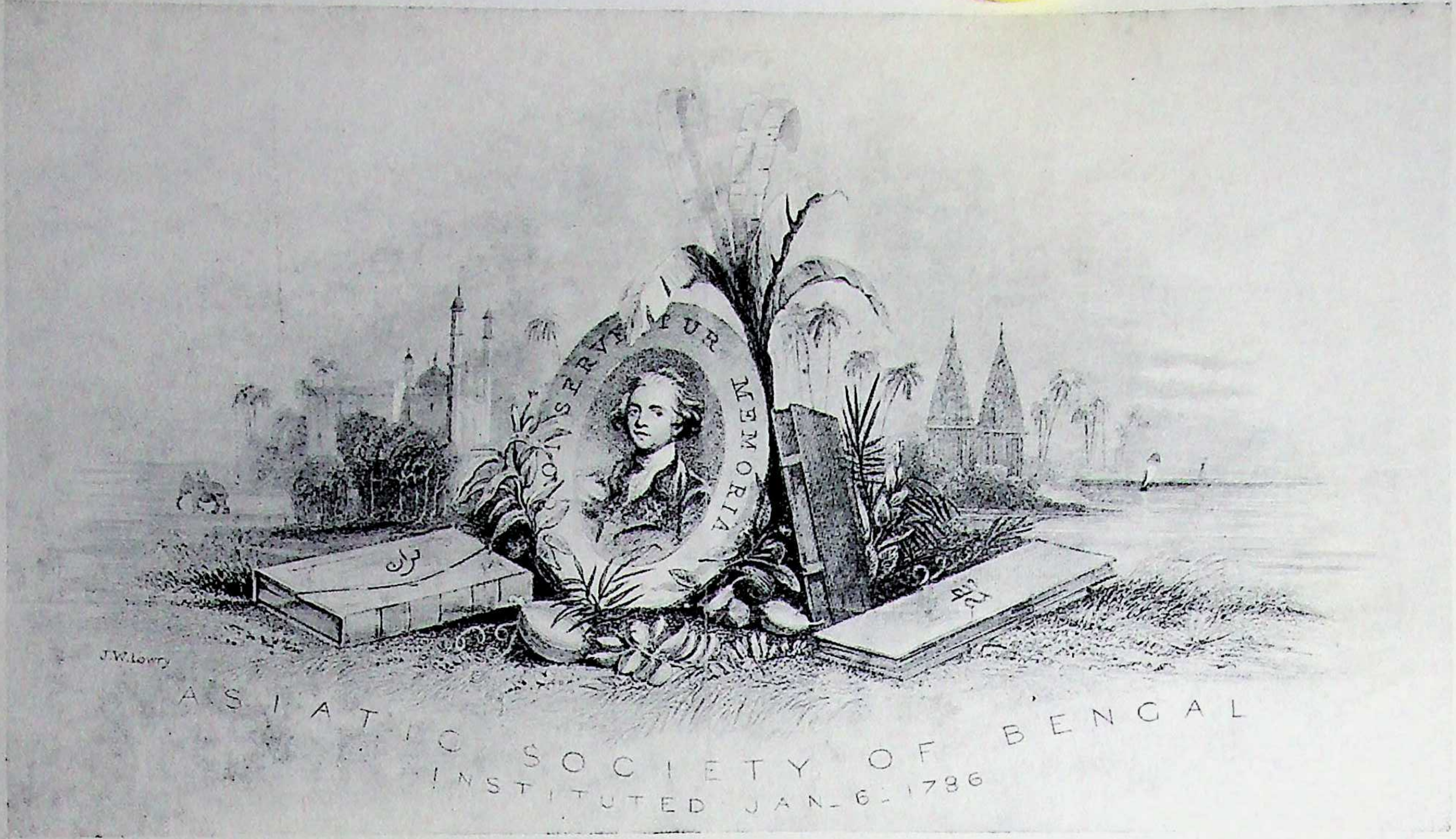
MEETING OF THE PHYSICAL AND LITERARY COMMITTEE OF THE ASIATIC SOCIETY HELD AT MALACCA 8 JUNE, 1811, UNDER THE PRESIDENCY OF THE RIGHT HONORABLE LORD MINTO: GOVERNOR-GENERAL'S CONVERSAZIONE IN NOVEMBER, 1836: ANNUAL MEETING: ANNUAL DINNER.

It may be of interest to refer here to a meeting of the Physical and Literary Committee of the Society held at Malacca in June, 1811, under the presidency of Lord Minto.

Lord Minto addressed the meeting in a short discourse, observing that the presence of several members of the Asiatick Society on the expedition which promised to open the way to an extensive field of enquiry on subjects connected with the Society's pursuits had suggested the propriety of assembling them.

His Lordship shortly alluded to the various heads of Geographical, Historical, Religious, Statistical, Juridical and Physical enquiry, and remarked that although the zealous policy of the Dutch Government had hitherto kept the world in ignorance of these matters, yet as the country of Java had been for two centuries in the possession or under the influence of a Nation which was at least formerly zealous and industrious in the pursuit of useful knowledge, it might be expected that much valuable information would be found in their records, and he therefore recommended a diligent examination in the first place, of those documents, that no time might be wasted in laborious research after objects which had already been fully investigated. I am afraid that not much work has since been done on the lines of research that were in the mind of Lord Minto. I hope it may still be possible to revive this idea and that no political consideration will be a hindrance.

On Tuesday, the 9th November, 1836, was held the first of a series of entertainments, which appeared to be the harbingers of a new era for Scientific and Literary Research in India. Acting on the example of the Duke of Sussex, President of the Royal Society, Lord Auckland, as Patron of the Asiatic Society, had expressed a desire to assemble around him at these periodical parties, in a social way, the members of the Society and others who were known to cultivate the fine arts, the sciences, or literature, and to collect on his tables for their inspection and amusement, 'whatever is performed by Man or produced by Nature'. Thus those who contributed thereto would have the satisfaction of knowing that their donations or their inventions would be likewise viewed by the head of the Government, and by a much more numerous

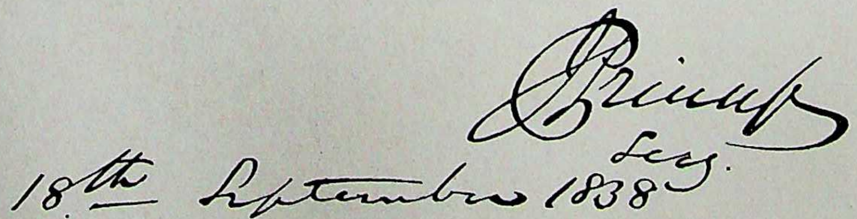

CONSERVETUR MEMORIA
J.W.Lowry

ASIATIC SOCIETY OF BENGAL
INSTITUTED JAN. 6. 1786

To The Committee of Papers of the Asiatic Society

Gentlemen —

PLATE II.



J Prinsep
Secy.
18th September 1838

Vignette appearing on the Society's letter paper, from a letter by J. Prinsep, 1838.

सन्दर्भ ग्रन्थ
REFERENCE BOOK

assemblage than could ever be enticed to an ordinary meeting. Schemes for scientific exploration, plans of national improvement, useful mechanical inventions, promising talent in the fine arts, would be brought forward, canvassed and encouraged, where encouragement was due, and the stimulus which had been wanting since the days of Minto and Moira, would again be restored. Unfortunately such meetings were not subsequently held.

The business at the Annual Meeting in the time of Sir William Jones was limited to the reading of the annual address. After his death such addresses were not continued, and no Annual Meeting was held. The office-bearers were elected, since 1796, at the ordinary December meeting. In 1833, Mr. James Prinsep introduced, for the first time, the practice of submitting a brief annual report in January. Mr. Torrens discontinued it in 1841, but his successors revived the practice in 1846, and since 1851 the rules of the Society render it imperative. The old practice of delivering an annual address from the chair, after having been dropped for some time, has now for many years in succession been regularly followed.

In 1828 it was resolved, that the anniversary of the Society should be celebrated by an annual dinner but this procedure was not followed in subsequent years. I am sorry that at present there is no annual dinner or any other social function to celebrate the anniversary of our Society, and I feel that such a function would serve a very useful purpose. On such occasions we could meet our Patrons and other distinguished guests, official and non-official, to the advantage of our Society, and I hope that it might be found possible for an anniversary dinner to be arranged in future years in the form of a voluntary subscription dinner given by the members of the Society without any financial responsibility on the part of the Society.

Changes in the name of the Society.

The history of the origin of the name of *Asiatic Society of Bengal* instead of *Asiatick Society* is an interesting study. On the 30th August, 1899, the question of the resumption by the Society of its original name of Asiatic Society was referred by the Council of the Society to a Committee, which came to the following conclusions. (For fuller details one is referred to the Proceedings of the Committee):—

'The Asiatick Society' published its transactions under the designation of '*The Asiatick Researches*' and only modified its original title by dropping, in 1825, the antique *k* in 'Asiatick'.

In 1832 the Society accorded permission to its Secretary, Mr. James Prinsep, editor of '*Gleanings in Science*', originally started by Mr. Herbert, to continue that publication under

सन्दर्भ ग्रन्थ
REFERENCE BOOK

the designation of '*The Journal of the Asiatic Society*'. In availing himself of this permission, Prinsep took the liberty of adding *on the title-page* the words 'of Bengal'. This he probably did with the view of distinguishing this Society from the 'Royal Asiatic Society' which had recently been started in London, and later gained a branch in Bombay.

The Committee recommended to the Council: 'That our Society, as the parent of all the other Asiatic Societies, may resume in its correspondence and publications its still unrevoked designation of "The Asiatic Society" in accordance with the terms of our foundation'.

While agreeing with some of the findings of the Committee, there are some facts which I would like to add to their findings to make them more accurate. I do not agree with them that there was any special motive on the part of Prinsep in adding the words '*of Bengal*'.

The spelling 'Asiatic' occurs much earlier than the year 1825 in the manuscript record books of the proceedings of the Society. Thus in the proceedings of the first meeting of the Society held on 22nd January, 1784, and of many subsequent meetings the word 'Asiatic' is so spelled in these record books. I need not enumerate all cases separately.

It is probable that the idea of adding on the title-page of the Journal the words '*of Bengal*' occurred to Mr. Prinsep not so much with the view of distinguishing the Asiatic Society from the Royal Asiatic Society, as with the object of following the precedent of the Royal Society of London, or perhaps the addition of these words suggested itself to him from the Society having been called *Asiatic Society of Bengal* by the Royal Asiatic Society at its general meeting held on 14th March, 1829, in which it was resolved to authorise their Council to write to the Asiatic Society *of Bengal*, meaning thereby the Asiatick Society, to unite with the Royal Asiatic Society.

Although the title-page of the Journal contained the words '*of Bengal*', still in the earlier volumes Prinsep styled himself 'Secretary, Asiatic Society'. It will be seen from what I have stated that the words '*of Bengal*' were used without any special motive whatsoever, and I am sure Prinsep would have been the last person to use these words to distinguish our Society from other Asiatic Societies at the cost of sacrificing a name which would suggest its distinguishing feature as parent of all the other Asiatic Societies, except the Batavian Society.

The Committee was, further, not correct in their finding that the Society continued in correspondence *invariably* to call itself, and to be addressed by others as, simply, 'The Asiatic Society'. On the other hand, the Society was sometimes addressed Asiatic Society of Bengal, occasionally of Calcutta or of Fort William.

It is not my intention to quote here all the records in which the Society was addressed or addressed itself as Asiatic Society *of Bengal* in earlier days. They may be found by carefully scrutinizing the old archives of the Society. I shall mention here a few instances only.

The emblem, printed in letters of the Asiatic Society, to which I have already referred, contain the words '*of Bengal*'.

It is possible that the Committee in their enquiry did not come across any original letters that were written by the Society about 1838 bearing this inscription. In addition to the above vignette, I have discovered others in letters written during 1838, in which the words '*of Bengal*' were used. These are reproduced here. In the contents of some of the letters mentioned above, the words '*Asiatic Society*' are used. Evidently, the words '*of Bengal*' were used without any definite purpose.

In the epitaph placed on the tomb of Csoma Körösi, occur the following words 'HIS FELLOW LABOURERS, THE ASIATIC SOCIETY *OF BENGAL,* INSCRIBE THIS TABLET TO HIS MEMORY'.

The recommendations of the Committee mentioned above were accepted by the Council on 29th September, 1899, but were not accepted at the General Meeting of the Society held on 31st January, 1900; and thus the name 'Asiatic Society of Bengal' was retained. It is a pity that this matter was brought up for discussion and final decision in the above way. It would have been far better, if the name 'Asiatic Society' with or without the words '*of Bengal*' were used indifferently. In this respect, I shall state what is the practice in the case of the Royal Society. The *Philosophical Transactions* are published under the name of the Royal Society of London, and printed by the Royal Society. The proceedings are published as *Proceedings of the Royal Society*. In the *Year Book of the Royal Society* the title-page contains the words '*of London*'. No confusion has arisen out of these variations, and the same would have been the case with our Society if the matter had not been decided as to whether the words '*of Bengal*' should or should not be retained. Whenever one uses the name the Royal Society, it always means the Royal Society of London. So whenever the words 'Asiatic Society' were to be used, it would have meant the 'Asiatic Society of Bengal'. Its distinctive feature as the parent of the other later Asiatic Societies would have been maintained for all times.

I now ask, is it too late to re-open the question?

ASIATIC SOCIETY'S PERIODICAL: THE ORGAN OF THE ASIATIC SOCIETY: BIBLIOTHECA ASIATICA: BIBLIOTHECA INDICA.

The publication of the *Asiatic Miscellany* contemplated by Sir William Jones was never accomplished. In July, 1787, he submitted to the Society a proposal to have its transactions printed by the Superintendent of the Hon'ble Company's press who agreed to publish them 'for the produce of their sale'. This proposal seems to have fallen through. Ultimately, one Manuel Cantopher of the Company's printing office undertook the job as a private speculation and at his own responsibility, and the name approved for the periodical was *Asiatic Researches*, the first volume of which was published in 1788. This periodical was continued up to 1839. In 1829 Captain Herbert started a journal under the name of *Gleanings in Science*, in which a *précis* of the monthly proceedings of the Society was regularly published. On the 7th March, 1832, the Asiatic Society passed a resolution that this Journal should be permitted to assume the title of *Journal of the Asiatic Society* and to continue it as long as its publication remained under the charge of one or both of the Secretaries of the Society. In dedicating the first volume to Captain Herbert, Prinsep, the Secretary, stated that it was in all respects but title, a continuation of Herbert's original work of *Gleanings in Science*. Subsequently, however, its character was entirely changed and in course of time it superseded the *Researches*. For some time, the Journal was called *Journal of the Asiatic Society of Bengal, New Series*. The earlier existence of this name of *Journal of the Asiatic Society of Bengal, New Series*, does not seem to have been noticed in recent times and it must not be confounded with the *Journal and Proceedings of the Asiatic Society of Bengal, New Series*, of the present day. Originally the *Journal of the Asiatic Society of Bengal* was edited by Prinsep, and subsequently by the Secretary or Secretary and Sub-Secretary. Afterwards (from 1865 to 1904) the Proceedings were published as a separate publication which continued for 40 years. Still later, in 1904, the *Journal and Proceedings* have been combined and published under the name of the *Journal and Proceedings of the Asiatic Society of Bengal, New Series*, which is being continued up to the present day.

Besides the above, the Society publishes its *Memoirs*, its *Bibliotheca Indica*, and other miscellaneous publications.

The following remarks from the Introduction to the first volume of the *Asiatic Researches*, are quoted below, with the hope that they will be remembered by every member of the Society and every person who is interested in the Asiatic Society of Bengal and its *Journal*. By the publication of the

Asiatic Researches 'the institution may be considered as having taken root; but the plant will flourish or fade, according as the activity or remissness of the Members and their correspondents shall promote or obstruct its growth: it will flourish, if naturalists, chemists, antiquaries, philologers, and men of Science, in different parts of Asia, will commit their observations to writing, and send them to the President or the Secretary at Calcutta; it will languish, if such communications shall be long intermitted; and it will die away, if they shall entirely cease'.

The above lines slightly modified were, according to the authority of Prinsep, written by Sir William Jones and were quoted in the *Journal of the Asiatic Society* on the title-page in the earlier volumes.

On the 2nd July, 1806, the Society resolved that it should publish, from time to time as their funds would admit, volumes distinct from the *Asiatic Researches*, translations of short works in the Sanskrit and other Asiatic languages, or extracts and descriptive accounts of books of greater length in those languages, which might be offered to the Society, and appeared deserving of publication, and that, as this publication was expected gradually to extend to all Asiatic books of which copies might be deposited in the library of the Society, and even to all works extant in the learned languages of Asia; the series of the volumes, should be entitled *Bibliotheca Asiatica*, or *A Descriptive Catalogue of Asiatic Books with extracts and translations.*

In the preface to the *Journal of the Asiatic Society of Bengal*, Vol. V, 1836, Prinsep suggested that the Government should make over to the Society all the Sanskrit, Arabic, and Persian works that had hitherto been issued from the Education Press, in order that one system of distribution and sale might be instituted for the whole series; and that, under the name of *Bibliotheca Asiatica* this body of Indian classical lore might be encouraged and regarded in the light of a national undertaking, entrusted merely to the vigilant superintendence of the Society as the appropriate organ of their publication.

It would seem that materials have never been received for preparing a volume of the proposed work. I have not been able to trace any publications under the name of *Bibliotheca Asiatica.*

The plan of publishing a *Bibliotheca Indica* was approved by the Society, after it was suggested in a judicious minute by Mr. Laidlay, dated December, 1847. Mr. Laidlay considered that the name *Bibliotheca Indica* would be a better name than *Bibliotheca Asiatica*. The work was taken in hand at the beginning of 1848 and Roër was appointed the chief editor. The series was, at first, published under the patronage of the Directors of the East India Company and the superintendence of the Asiatic Society of Bengal. The first fascicle, dated January to April, 1848, was printed in 1849. The original idea was to publish monthly fascicles, and that its collections might represent any oriental language provided they related to India. It was also held that the greater part of it would be taken from Sanskrit, as it was believed that Sanskrit was more intimately connected with India than any other oriental language. The remarkable series of works published in the *Bibliotheca Indica* is perhaps unparalleled in the history of the literary world and I most strongly urge that even the worst financial difficulties should not hamper its activities.

ASIATIC SOCIETY'S HOUSE.

Originally the Society had no house of its own and its meetings were held in the Grand Jury Room of the old Supreme Court. In 1804 the Government granted a plot of land to the Society, at the corner of Park Street, which had been previously in the possession of a Riding School. Another portion of land situated to the western side of this spot was subsequently given to the Society by the Government in 1849.

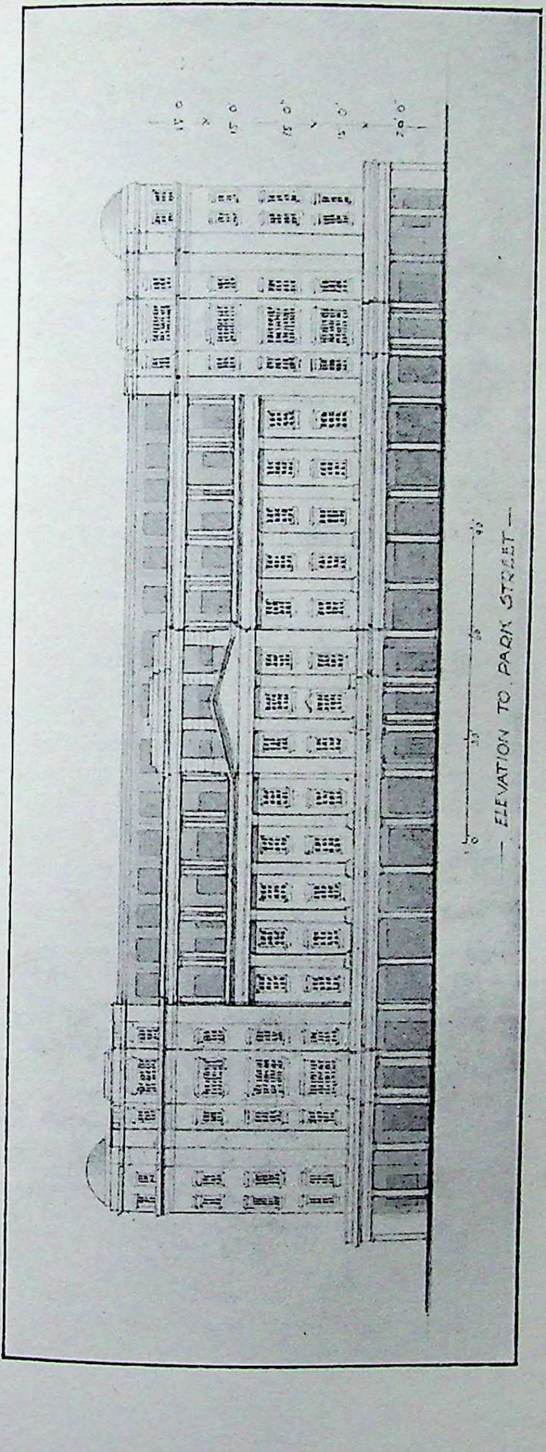
In 1805, the Society undertook the building of a house. It was designed by Capt. Lock and the plan after some modifications, was made over to a Frenchman. The Society took possession of its house in 1808.

The idea of having a Museum of the Society was first started in 1796, but it was not until some time after the completion of its house that measures were taken to carry out this object.

It was in the Library rooms of this building that Csoma Körösi resided and spent his nights and days after he came to Calcutta in May, 1832.

Apart from the use made of it for its own purposes by the Society, the house had always been accessible to the public for literary and scientific lectures. In 1822, the use of the meeting room was granted to the Serampore missionaries for a course of lectures on phrenology, and the Medical and Physical Society of Calcutta held its meetings and had their office and library in the house for upwards of thirty years. Even to-day many public meetings are held here.

Our building is one of the oldest buildings in Calcutta. In recent years, a proposal was made to demolish this old building and construct a new one in its place at a cost of several lacs of rupees, with the idea that portions of the new building might be let out for the purpose of providing income to the Society. The whole scheme was subsequently dropped


— ELEVATION TO PARK STREET —

Proposed design for a new building for the Asiatic Society of Bengal, 1920.

after prolonged discussion on account of financial difficulties and risk. The design of this proposed new building is shown in the accompanying diagram. It is possible that, at some future date, when this Society's house is reconstructed, as it must be one day, this plan may prove useful to a future architect.

THE ASIATIC SOCIETY AND THE INDIAN MUSEUM: THE SCIENTIFIC SURVEYS OF INDIA.

As President of the Asiatic Society of Bengal and as Vice-President of the Board of Trustees of the Indian Museum, I hope I may be pardoned if I say here some words about the Indian Museum, the early history of which is intimately connected with the Museum of the Asiatic Society.

It is unnecessary to review here the history of the development of the Museums of the Asiatic Society of Bengal and of the Indian Museum. This history has been very well set forth in the Centenary Review of the Society, in the booklet entitled *the Indian Museum*, which was prepared by the Trustees of the Indian Museum in commemoration of the hundredth anniversary foundation of the Asiatic Society's Museum, and more briefly mentioned in my first presidential address. There is no doubt that the exertions made for the establishment of this national museum and the endowment of it with the richest collections of specimens available in India are acts for which the Asiatic Society deserves the highest credit.

For this reason the members of the Asiatic Society view with dismay, and protest against future retrenchment of, a National Museum, which was created at their instance and which started, as its nucleus, with the Museum of our Society.

Under Act No. XVII of 1866, the Museum was established as partly intended for the reception of Library, Manuscripts, Maps, Coins, Busts, Pictures, Engravings and other property of the Asiatic Society. In one sense therefore the Government of India, through the Trustees of the Indian Museum, holds in perpetual trust the valuable collections of the old Museum of the Asiatic Society of Bengal. When the collections belonging to the Museum of the Asiatic Society of Bengal were handed over to the Indian Museum, it was no doubt with the idea that they would there be better looked after than could be done by a private Society and that the Museum would grow more and more in various directions under the care and maintenance of the Government of India.

A Museum, as the name implies, is a temple of the Muses. In the National Indian Museum we have collections of scientific, historical, archæological, anthropological, and literary interest. Here the Muses of Greek mythology may not exist, but the spirit of the Muses of Indian mythology and of history largely pervades it.

If in this Museum we desire to furnish to the researcher materials and opportunities for laboratory work in Zoology, Geology, Economic Botany, and Archæology, or to aid teachers in explaining to their pupils the principles of Art, Nature, and History, then its higher staff must be materially strengthened. Further, there should be here a still greater display of attractive and well-planned exhibition-series than are available at present, to stimulate and broaden the minds of those who are not primarily engaged in scholarly research.

The sciences included under the Surveys connected with the Museum consist of Geology, Zoology, and Botany. These sciences are somewhat different from the basic sciences of physics and chemistry. The researcher in the latter sciences can carry on most of his researches in his laboratory and therefore does not require extensive field work as in the case of Geology, Zoology, and Botany. These latter require extensive field work which can only be undertaken by persons who do not have to devote much of their time in teaching work. At any rate such work is not at present possible in the universities and will not be possible until they are much better financed. In other words, work in applied Geology, Zoology, and Botany must still be carried on by the Surveys for several years to come. Economic Zoology, Geology, and Botany will increase the resources of a country where there are yet unexplored lines of research which must lead to human well-being, prosperity and happiness. To scrap the Science Surveys is a very shortsighted policy and will cause great economic loss in the long run.

THE ZOOLOGICAL SURVEY.

I shall now speak in some detail of the Zoological Survey, in which the most drastic retrenchments have been suggested. One of the effects of the curtailment of the expenditure of the Zoological Survey would be that the large collections of valuable specimens belonging to the old Museum of the Asiatic Society of Bengal and other valuable additions made from time to time will be neglected and ruined for want of proper care. Further, any attempt to add to the zoological collections will be hampered considerably and may eventually even come to an end. The functions of the Zoological Survey are distinct from those of the Zoological Departments of Universities in India, most of which are still in their infancy. The Zoological or Natural History Section of the Indian Museum is a national asset not for Calcutta or Bengal but for the whole of India. It is stated by the Retrenchment Committee 'that the work of the Universities could and should be of the nature which must overlap the activities of a Government Zoological Department'. I am sure that if any such overlapping does take place, it will be more or less of a supplementary nature which would be most advantageous to Indian Zoology. Curtailing the activities of the Survey must be immediately followed by enormous expenditure in the zoological departments of the universities in order to maintain proper research in Natural History. That means multiplication of more or less the same kind of work with much greater expenditure of money, and mere diversion of the expenditure from the Central Government to the Provincial Governments. This is neither economical, nor desirable, nor feasible. Further, certain work of the Zoological Survey cannot be undertaken by the Universities. This consists of extensive field work for prolonged periods; of careful and detailed systematic work on the innumerable types of animals from different parts of the Indian Empire and of their identification, of the collection of different species and the study of their habits and peculiarities, and the comparative study of the same; and of various other activities not possible for persons whose time is largely spent in the teaching work of the Universities.

I shall now briefly indicate the value of the study of Zoology in India from an economic standpoint and from the point of view of general health and sanitation.

In order that man may be able to live in a tropical country teeming with numerous parasitic diseases, it is essential that our experts should be acquainted with certain branches of Zoology. The investigations on the parasites of texas fever of cattle and its transmission by bites of ticks; on the parasites of malaria of man and birds and their carriage by mosquitoes; on the parasites of human trypanosomiasis and its transmission by tsetse flies; on the trypanosome nature of the parasite of the African cattle disease,—all these belong to the Science of Zoology. The value of these researches cannot be over-estimated.

The structure and habits of certain worms and the diseases produced by them; the structure and habits of certain predatory and harmful animals and the adoption of the means of combating them, such as, poisonous snakes, and the like; the study of the parasitic protozoa, worms, insects, which devastate crops and destroy food-trees; the study of the animals beneficial to man, such as, for instance, those serving as food, or helping agriculture; the study of the economic insects and their importance from the point of view of their relationship to agricultural problems; the study of stock breeding, production of dairy products and fisheries and the like; the study of the problems of the preservation of race, of genetics, of segregation and its significance for the progressive evolution of the future human race—all belong to the Science of Zoology.

One branch of Zoology of quite especial importance to India is ichthyology, the study of fishes. In a country where fish forms so large a part of the diet of its inhabitants, and which as a peninsula possesses an enormous seaboard, whilst its large tropical rivers and smaller hill-streams are rich in edible fauna, which in its mountain rivers has developed quite peculiar features, the scientific study of fish life is of the utmost importance as it furnishes in great part the scientific basis for the practical measures to be taken by the purely economic Departments of Fisheries in the various parts of India.

How strong, therefore, must be our regret to learn that the services of the only fish specialist in the Zoological Survey of India, Dr. Sunder Lal Hora, a man of international reputation, have been dispensed with as a result of the recommendations of the Retrenchment Committee appointed by the Government: Surely not only a scientific but an economic loss to the country.

I cannot pass over, without reference, another very great loss to Zoological Science in India through the retrenchment of the post of the Director, Zoological Survey of India. Its incumbent, Lt.-Col. R. B. S. Sewell, last year's President of our Society, whose work on the Oceanography of the Indian Ocean, on the highly diversified marine fauna of India, especially the Copepoda, and whose classical work on the Cercariæ are well known to scientists all over the world, has been made to revert to the Indian Medical Service. Col. Sewell gave up his medical work years ago, and in his new employment his special knowledge of Zoology and his vast acquaintance with the marine fauna will be rendered entirely unproductive to the country and to science.

A few years ago, the Government of India, after careful consideration, gave administrative sanction to the extension of the buildings of the Zoological Survey, the present one being found too inadequate, where the enormous number of specimens of the Zoological Department might be properly accommodated, studied, and identified and where its Library could be properly housed, and now we find the Retrenchment Committee has made a recommendation which is the reverse of what the Government had previously in their contemplation. The Library of the Zoological Survey supplemented by that of the Asiatic Society is perhaps the finest library in the whole of Asia, but as a result of retrenchment, the library of the Zoological Survey will speedily deteriorate and become out of date and thus one of the finest reference libraries on Zoology will be spoilt for ever. What a disaster this would mean, even a tyro in science can understand.

In the case of the British Museum the collections in Natural History Section once grew so very big that a building of a special Branch Museum was commenced in 1873 at Kensington for the reception of exhibits relating to all phases of Natural History. It is therefore strange that the Natural History Section of the Indian Museum, the department of Zoology, should be, on the contrary, severely retrenched.

The Government of India must take the lead in the active campaign against deadly parasitic diseases in the country. It must realise its responsibilities and undertake to rout the forces of disease which hold India in thrall, and this can be properly done only by the fullest maintenance of the Zoological Survey of India.

Let me now say some words about the Geological and Botanical Surveys.

THE GEOLOGICAL SURVEY.

The Geological Survey helps to unearth the untold treasures that are hidden under Indian soil and thereby adds to the wealth and prosperity of the country. Its researches contribute substantially to the solution of the unemployment problem in India by finding out new avenues of employment, of trade, in and outside India, in oil and other minerals which, if their resources were fully tapped, would make India one of the richest countries of the world. It is only by the fuller development and utilisation of her natural resources that the economic problems of India can be solved and the effects of any financial crisis reduced to a minimum. The Retrenchment Committee seems to hold the view that as the department has been in existence for nearly eighty years it has already accomplished all the work that it could accomplish and so has outlived its usefulness. This view is certainly incorrect, as, on the contrary, the stage has now been reached when after long preparation the usefulness of this department could be greatly increased by adding to the material wealth of the country, if its work were continued on proper lines. Researches in any scientific department must be endless and the conclusion that the existence for eighty years of a scientific department means the end of its research is unsound. One might just as well say that researches in mathematics, physics, and chemistry must be nowadays useless because they have been carried on for several hundred years. How wrong such a conclusion would be I need not discuss. To give a single example: I have the privilege of knowing a distinguished gentleman who occupies a high position in the Government and who owns vast properties in the Eastern parts of India where there is every likelihood that the Geological Survey may reveal the presence of oil mines or minerals, and

I believe that such unexplored areas must also exist in other parts of India.

The primary work of the Geological Survey is to produce a geological map of the country on which the major part of the industrial development of the country is based. As is well known, a knowledge of the Geology of the formations in which mineral resources occur in any country is a preliminary essential for the exploration of such resources. The mineral deposits can only be worked economically after investigations regarding the nature of the rock formations, including their distribution, their quality and quantity have been carried out. It follows, therefore, that with the development of mineral industries in any country the need for intensive geological investigation increases proportionately. Since its creation the Geological Survey of India has studied deposits of various useful minerals, such as gold, coal, petroleum, manganese, mica, iron ore, copper, tin, tungsten, bauxite, etc., in all parts of India; and intensive exploitation of most of these minerals, such as is being carried on to-day, would not have been possible but for the carefully collected and collated information which the department has been able to supply. The work of the Survey has led to the establishment of numerous mines and manufactories in different parts of India, and this work, besides bringing in a great deal of revenue to the Central and Local Governments, has provided employment for a large population of both skilled and unskilled labour. The Geological Survey, further, has given invaluable advice and information to Local Governments, States, and Public Bodies on questions relating to water-supply and engineering works. Among such may be mentioned the selection of sites for dams and reservoirs in connection with hydro-electric schemes and town water-supplies, the examination of alignments for rails and roads in different parts of the country, the selection of sites for tunnels, bridges, and information regarding the stability of hill-slopes and prevention of land-slides, and so on.

In addition to the work on Applied Geology detailed above, the Geological Survey has taken a very prominent part in the Geological Education of the country and the scientific results of the work of its members are extremely valuable. The publications of the Geological Survey of India are recognised as the most up-to-date and also the principal source of information with reference to the geology of the vast area of India. I do not propose to go into details concerning this side of its activities, but there is no doubt that retrenchment, such as is proposed, in the activities of this department, will not only set back our knowledge of the geological formations in this country, but also make it impossible to carry on the necessary activities that would add to further knowledge of

Economic Geology, the potentialities of which in India are evidently unbounded.

Lastly, as in the case of the Zoological Survey, the library of the Geological Survey, supplemented by that of the Asiatic Society, constitutes one of the finest libraries in Asia and retrenchment would mean deterioration of its quality and usefulness.

THE BOTANICAL SURVEY.

As regards the Botanical Survey, if further study of Economic Botany is stimulated by Government by encouraging more intensive researches in cinchona plantation, in forestry, in agriculture, and the vast unexplored field of medicinal plants which may be useful in India, then the existence and the maintenance of the Botanical Survey will be fully justified and more than amply paid for.

It was during Sir George King's time that the Botanical Survey of India came into existence in the year 1891 or thereabout. He and his predecessors gained world-wide reputation by their memorable work on Indian Botany as a result of exploration in the different parts of the Indian Empire. After him came Prain who, over and above his invaluable work on the Floras of the different provinces in this country, profitably applied his energy to Economic Botany. His investigations on wheat, sugarcane, hemp, and other plants are instances of some of his activities in this direction. It was the researchers of the Botanical Survey and of the Royal Botanical Garden at Calcutta that led to the introduction of many plants, such as tea, potato, cinchona, spices, flax, hemp, coffee, cocoa, and many others. The introduction of so many economic plants which supply practically all daily necessities of our life is the result of exploration in the tropical parts of this country and the neighbouring countries, such as Burma, the Andamans, and the Malaya Archipelago. The recent exploration carried on in the Cinchona Reserve area in Tenasserin, the Mergui District, South Burma, has led to the discovery of abundant growth of a plant called Blumea balsemifera which yields crude camphor. The biological, including the botanical, investigation of fresh water, brackish water, and salt water of this country may lead to valuable data for scientific pisciculture in this country. Recent investigation in santonin-producing plants in the North-West deserves here special mention. Thus the importance of the exploration work in Botany cannot be exaggerated. The survey of the medicinal plants, timber plants, plants of great horticultural importance, such as that of the wild rose of Manipur and various other plants of economic importance is essential. The vegetable resources of this country are not yet properly explored and to carry on this investigation it is imperative that there should be a department like the Botanical Survey of India. The Cryptogamic flora of this country which may lead to valuable discoveries of great economic importance is still left almost untouched. The survey of marine algae along the shores of the Indian Empire may supply sufficient raw materials for profitable industry in agar agar and iodine.

The cultivation of the medicinal plants which holds such bright prospects in this country with such varied climates, ranging from the coldest to the hottest, cannot be undertaken unless and until exploration is carried on to discover the climatic conditions and other factors controlling the growth and occurrence of the medicinal plants. The Botanical Survey of India is at present very poor and insufficient to cope with such enormous work which promises a bright future for this country. Mr. Calder, the Director of the Survey, states in his report for 1929-30 that there is a rapidly accumulating mass of collections exceeding the capacity of the strength of the present staff to deal with in detail. The scope of the field of activities of the Survey extended during the year under review from the border of India in the North-West and North-East to the extreme limits of Burma in the South-East and into the furthermost point of the Indian Peninsula.

It may be interesting to note here the Report of the Sub-Committee appointed at the Thirty-sixth Meeting of the Board of Scientific Advice of the Government of India, to consider proposals for a reorganization of the Botanical Survey of India, consisting of Col. Gage and others. Their recommendations were:—

1. The Government of India to take over the Royal Botanic Garden, Calcutta, with its Herbarium and Library.
2. The Herbarium and Library of the Botanical Survey, at present in the Indian Museum, to be transferred to and amalgamated with the Herbarium and Library of the Royal Botanic Garden, and Herbarium building to be enlarged.
3. A research laboratory to be built in the Royal Botanic Garden.
4. The public galleries of the Industrial Section of the Indian Museum to be retained where they are, and developed under the charge of a highly qualified staff.
5. The staff of the Botanical Survey to be enlarged as rapidly as possible to the scale and on the pay indicated.

Total recurring expenditure was estimated to be Rs. 4,50.000 per year.

Further, they stated that 'The Sub-Committee is aware that it may not be possible for Government to give full and instant effect to the proposals in this report, but it would strongly urge the desirability of at least a beginning being made with as little delay as possible. The Sub-Committee fully appreciates that the expenditure that will be ultimately necessary is very considerable'.

It is therefore very strange that instead of trying to give effect to the above scheme, suggestions have been made to retrench the Botanical Survey.

The publication of the *Annals of the Royal Botanic Garden* and the *Records of the Botanical Survey of India* are most valuable publications of international standard where illustrious botanists of world-wide reputation contribute the results of their investigation on Indian materials.

THE ARCHÆOLOGICAL SURVEY.

In the Section of Archæology more than two thousand sculptures, many of which were originally the property of the Asiatic Society of Bengal, subsequently handed over to the Museum for proper care and preservation, and which are fine specimens of art and truly representative of the schools to which they belong, are now lying in dark and damp cellars. It was never imagined by the Asiatic Society that on account of financial stringency their collections would come to be treated in this way, and kept in this condition without being catalogued or properly looked after. The cataloguing of these collections in this Section of the Museum, a more up-to-date cataloguing of Muhammadan and non-Muhammadan coins, of the Pearse collection of gems and coins, and other gems, constitutes work that must be taken up by the Section. This work is already long overdue. Similarly, over eleven thousand Sanskrit Manuscripts which are lying in heaps in the office of the Archæological Section must be properly arranged, studied, and catalogued.

I, therefore, wonder how any retrenchment can be effected in a department which really requires further expansion. If to all this we add the work of excavation which has yet to be undertaken in Bengal and other parts of India, then it becomes clear that greater extension of this Section is required and that any idea of retrenchment must be regarded as unwise.

The Retrenchment Committee of the Government of India have proposed the abolition of the post of Superintendent of the Section and the handing over of its charge to the Superintendent of Archæology, Eastern Circle, whose principal duty is to carry on the conservation of ancient monuments in Bengal and Assam. Nothing could be more unfortunate. Such a system was tried in the past, but never proved a success. The post of a whole-time Curator was therefore created in 1921, about which the late Dr. Spooner in the Archæological Department's Annual Report for 1921-22 wrote as follows: 'For several years the heavy responsibilities for this Section were unavoidably placed as an additional burden upon one already overworked official after another, to the inevitable dissatisfaction of all concerned and most of all the officers themselves. The collection, which is the most extensive and important in India, called urgently for re-arrangement and development, and offered almost unlimited scope for study. But with multiple other duties pressing upon them, including the obligation to be away from Calcutta for a large part of the year on tour, *the part-time officers-in-charge found it out of question to undertake the development of the Section seriously, and what was practically stagnation resulted.* It is therefore with peculiar satisfaction that we record the termination of these make-shift arrangements by the appointment on the 23rd May, 1921, of a whole-time Superintendent for the Archæological Section.'

The Retrenchment Committee have also suggested that further funds should not be allotted for excavations. As a result of this the wonderful sites of Mohenjodaro and Harappa which have carried the history of India to a hoary antiquity and have shed so much light on her past culture and civilization will remain unexplored. According to this suggestion, the excavation staff recently employed, trained, and made permanent, is very soon going to be disbanded, although it was only very recently that Sir John Marshall and the Government of India were fighting hard to get the legislature to sanction a permanent fund for carrying on further excavations. It is difficult to imagine that in the near future money will not be forthcoming for further excavations in India and for the appointment of a Curator to look after the largest collection of Indian antiquities in the world, in the Indian Museum, although funds will not be lacking for the retention of a highly paid Epigraphist assisted by three others, a whole-time Curator for the small Central Asian Museum at New Delhi which has not even a house of its own, and a 'routine' Deputy Director-General to assist the Director-General of Archæology in the disposal of his office files.

RETRENCHMENTS AND THE INDIAN MUSEUM.

Your Excellency, I have been given to understand that in none of the other civilized countries, which also, as a result of economic troubles all the world over, are faced with problems probably much more acute than in India, has the expenditure on the scientific services, departments or great institutions like the Royal Society, been reduced, and I cannot but enter, therefore, a very strong protest on behalf of the Asiatic Society of Bengal, the leading scientific and literary society of the country, against these retrenchments. All the members of the Society are anxious to see that the best use be made of the Asiatic Society's collections, kept in trust in the Indian Museum, and the subsequent additions thereto, and that they be not allowed to deteriorate or be destroyed for sufficient provision and care. I earnestly hope that my appeal on behalf of these collections will not fall on deaf ears and that the Government of India will rise to the occasion and, fully appreciating their responsibility in the matter, provide means for the proper preservation of the collections, and for the continuance of the excellent scientific work which the various departments of the Indian Museum have been doing.

I hope that the Government of India will be pleased to ascertain what action is being taken by the British Parliament concerning retrenchment of grants to institutions in England similar to the Indian Museum, and scientific societies like the Royal Society, before they retrench their grants to the Indian Museum.

Your Excellency, the tree of science is the tree of life, and its neglect will be detrimental to the good of mankind. Let luxuries be retrenched and let money be saved in the expenditure of brick and mortar; but let us not retrench those activities which are necessary for the advancement of scientific knowledge, which is conducive to the advancement of human happiness and welfare.

I would urge that the view still held by some people that expenditure on scientific research is an unprofitable financial luxury is not tenable. There is no doubt that expenditure on scientific research is one of the most profitable investments a Government could make. It has been made abundantly evident from past experience that the country that neglects the scientific investigation of its natural resources pays very heavily in the long run for its neglect.

Let us hope that it would not be necessary one day to raise funds for the maintenance and extension of the Indian Museum by means of public lottery with all the attendant scandal that arose in the case of the British Museum. We aspire to see our National Museum growing like that of the British Museum, where, as is stated by Boulton in his *Romance of the British Museum*, 'as we glance round we see grey-headed students and young men and women. Various nationalities are represented, dark-skinned as well as fair, an Eastern lady in flowing white robes may sit next to an English gentleman in sedate garb. One and all are evidently there for the purpose of obtaining information on one of the thousand and one subjects dealt with by the millions of books which are available for study'.

Let me end this part of my speech by saying that if India fails in her duty of advancing the prosperity and well-being of her people by retrenchments in its scientific departments, then one day there will be written of her 'thou art weighed in the balances and art found wanting'. Let not the so-called 'eternal want of pence' afflict the scientific departments of the Government and cripple their activities. Let it not be said that Armies and Navies must be kept up, but what is the use of a Museum? After all, its expenses are very small compared with the total expenditure of the Government.

Your Excellency, the Act No. X of 1910 of the Indian Museum provides:

> '11. (1) The Trustees shall cause every article in the collections in the said Indian Museum formerly belonging to the Asiatic Society of Bengal and all additions that may hereafter be made thereto otherwise than by purchase under section 6, to be marked and numbered and (subject to the provisions contained in sections 7 and 16) to be kept and preserved in the said Museum with such marks and numbers.
>
> (2) An inventory of such additions shall be made by the said Society, one copy whereof shall be signed by the Trustees and delivered to the said Society, and another copy shall be signed by the Council of the said Society and delivered to the Trustees, and shall be kept by them along with the inventory delivered to the predecessors in office of the Trustees when the said collections were deposited in the said Museum.
>
> 16. If the trust constituted by this Act is at any time determined,—
>
> (*a*) the collections and additions mentioned in section 11 shall become the property of the said Asiatic Society or their assigns.'

Your Excellency, the Asiatic Society of Bengal has therefore an interest in the collections of the Indian Museum and it is only right that its Council should represent to the Government of India through the Trustees of the Indian Museum that they greatly fear that their collections given over in trust to the Indian Museum will not be properly looked after and will seriously deteriorate, if all the retrenchments suggested by the Retrenchment Committee are given effect to. I make this suggestion for the consideration of our Council in the interest of one of the finest Museums of the world to which the Asiatic Society of Bengal once made most valuable contributions by providing its initial nucleus.

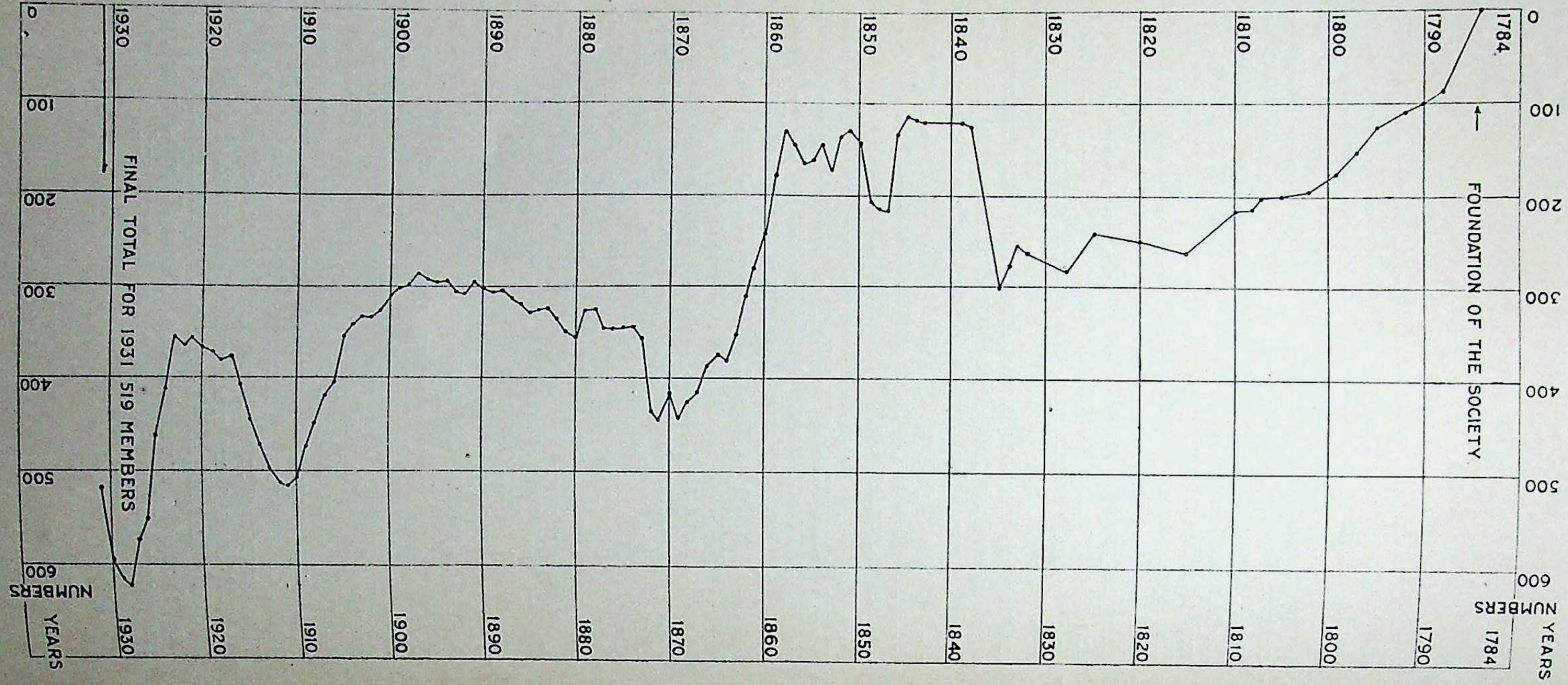
CERTAIN ASPECTS OF THE FUTURE FINANCE OF THE SOCIETY.

In my first presidential address in 1928, I dwelt upon certain aspects of the future of our Society. To-night I shall dwell upon another aspect of the same. A learned Society is judged in the eyes of the world by the value of its work, its productions, its publications. Most members join such a Society either to be able to meet their fellow-workers and thus obtain the benefit that results from the interchange of ideas, or to obtain the publications of the Society and thus to keep in touch with the progress made in the scientific or literary world, or to be able to consult the library maintained by it. The encouragement of research, the maintenance of the library, and the fullest possible distribution of its publications are, therefore, prime necessities for our own Society, if we are in the future to maintain and increase our prestige and our financial position. I regret that in the immediate past we have never been able adequately to build up our exchange list. One great advantage of extending our exchange list would be that we would thereby increase, to a corresponding extent, the number of publications of other learned societies and bodies that the Society would receive. To print off three, four, or even five hundred extra copies of our own journal adds but comparatively little to the cost and for this small increase we would reap a return that is out of all proportion to the increased cost. In order, therefore, to maintain our publications at such a level as will be beneficial to the Society, we should attempt to build up a *Publication Fund* the interest on which would to a large extent cover the cost of publication.

I venture to hope that our membership list may some time be vastly larger than it is at the present day. Let me mention here the number of members of some of the learned societies in other countries. Take for instance, Great Britain. There the Linnean Society, which concerns itself solely with Biology, has a membership list of 2,000, the Zoological Society of London more than double this, the Royal Society of Medicine 4,571 during 1929-30, and the Royal Society of Tropical Medicine and Hygiene 1,393 during the same year.

In this connection it is interesting to study the changes that have taken place in the numbers of the members of the Society during the 147 years of its existence. In the accompanying chart of the membership of the Society, for which I am indebted to our General Secretary, Mr. van Manen, one will notice that the number of members in the Society exhibits an almost rhythmical rise and fall, a period of increased membership being followed after a number of years by a considerable decrease, and in each case this decrease has in its turn been succeeded by a still further rise that always overtops the previous maximum. The history of the last few years provides us with another instance of the same process; in 1928 during my presidentship we reached our record total of 622. In the second year of my presidentship the number was about the same, i.e. 618. Since then we have unfortunately started on a downward movement and during the last

MEMBERSHIP CURVE ASIATIC SOCIETY OF BENGAL



year we lost 77 members, our total membership now standing at only 519. In order that fluctuations in membership should not hamper the work of the Society it is essential that we should try to build up a financial reserve, that would be sufficient to pay for a large part if not the whole of our printing and other charges incidental to the creation and maintenance of a large exchange list, such as the cost of packing, postage, and the labour entailed.

One tremendous drain on our financial resources is the amount that every year we have to pay in rates and taxes, an expenditure that is steadily increasing because it so happens that the site on which our old building stands would, if utilised for commercial purposes, be an extremely valuable one. In England all such societies as ours are by law exempt from the payment of rates and taxes and I would here appeal to the Corporation of this great city, the second city in the Empire, to extend to the Society the same consideration, the same assistance, as other corporations are required by law to give to the learned societies of other countries.

Another responsibility that rests upon a Society such as ours is the maintenance of our building. Our old building must sooner or later deteriorate and decay to the point when it no longer is habitable. As our possessions accumulate, and particularly as our Library grows and extends, the building in which these collections are housed, is put to a gradually increasing strain that was never contemplated by the architect who designed it. It is, therefore, essential that we should have a sufficiently large *Building Reserve Fund* to ensure that when that time comes the Society will be in a financial position to bear the cost of rebuilding and at the same time to meet the other incidental expenses. Our predecessors were not unmindful of their responsibility in this matter and they accumulated a building reserve fund that at one time might have been sufficient. But with the passage of the years, whilst the costs of construction have increased, the needs of the Society have expanded, and the requirements of space in any new building have grown. At the same time the Government Paper in which the funds of the building reserve fund had been invested has materially depreciated. The Society has not been in a position to undertake out of the accumulated assets the construction of a building of the dimensions and accommodation at present necessary. In 1923 the Society has therefore been obliged to renovate its old building thoroughly without any extension, but at the cost of almost the total of the available capital for the purpose. The actual balance now available in the building fund amounts to a few thousand rupees which in the current year will be reduced to almost nothing on account of further repairs undertaken at the close of last year when it proved that they could be deferred no longer.

I have already referred to our Library and pointed out the necessity of maintaining and expanding it. Unfortunately, here again such an expansion means of necessity an increased drain on the Society's resources. In order to maintain the Library in what may be termed a fluid condition, so that books can be easily got at, the exact knowledge of the position of every book in the library being the first necessity for such causes of reference, it is essential that the Society should maintain an adequate Library staff. The books in a climate such as ours require constant attention; they must be continually dusted and examined to ensure that they are not being attacked by insects or other pests; as the bindings get worn and perish, books must be rebound; and, finally, and what is particularly important, to all those members of the Society who do not live in Calcutta and who therefore cannot come to the Society to find out what books we possess, an up-to-date catalogue must be maintained, kept up-to-date and periodically printed, so that every member may have in his possession a copy, while periodical lists of additions to the library should be prepared and distributed *ad interim*. Here, again, the resources of the Society are totally inadequate for the full performance of these duties. We possess no whole-time Librarian, and although we have been fortunate in our Library Secretaries they can only spend a small amount of time in the Society's rooms and the major portion of the work of necessity falls on the shoulders of our General Secretary. Although we are now engaged in the preparation of a new catalogue, it will, I fear, be some considerable time before it is completed and published. There is therefore a pressing necessity for the creation of *an adequate Library Endowment Fund*. Though such a fund was started in 1926, at the present time it stands at only just over 6,500 rupees. The sum required annually to maintain the Library in a proper state must of necessity be increased *pari passu*. Unless our funds are very materially increased it will ultimately become impossible for the Society to maintain its library, in exactly the same way as in times past it became impossible for the Society to house and maintain its museum, an impossibility that resulted in the creation by the Government of India of the Indian Museum, expenditure on which, as I have already stated, it is proposed to retrench.

Lastly, we must have a proper staff to explore and keep in proper order the old archives of our Society. Reading through the oldest proceedings of the Society, I find that there is frequent reference to various apparently valuable documents such as, for instance, successive numbers of Books of Production. Where are these old records? They must be unearthed along with various other treasures, such as old pictures, that are now heaped up on the ground floor of our building, and for this we require *an Old Records and Manuscripts Endowment Fund.*

One might go on with quotation after quotation from the Presidential Addresses and the Addresses of our Patrons during recent years, in which they have stressed the urgent need of the Society for further endowments and for increased financial assistance from the Governments, both Provincial and Imperial.

In no country throughout the world has a society met with so little financial support from those to whom one might with every reason look for assistance.

It is an old saying that there are none so deaf as those who won't hear, but all old collections of maxims and sayings there is always a second that disproves the first; and one is reminded of the other saying that constant dropping weareth away the stone. Perhaps if we only go on reiterating our requests for increased assistance we may in the end achieve the same result as the importunate widow and have our petition granted not, however, by an 'unjust judge' but by a judge capable of views both broad and long. At least let us continue to hope.

Lastly, I hope that the retrenchment axe will not be used against the Asiatic Society of Bengal. The grants made to it by the Governments of India and of Bengal are so small that it would be most regrettable if these insignificant sums were diminished to the detriment of the interests of the oldest of all the Asiatic Societies in India.

I therefore appeal to the Governments of India and Bengal that they may generously withdraw the retrenchments that are contemplated in connection with the Asiatic Society of Bengal. I also appeal to the Rockefeller Foundation, which has assumed the activities of the International Education Board, to extend their generosity by endowments to our Society, in the same way as has been done for work in the Humanities in the United States and other countries, such as the Bodleian Library at the University of Oxford or the American Schools of Oriental Research in Jerusalem and Baghdad.

THE PORTRAITS OF THE SOCIETY'S PAST PRESIDENTS.

I have now the privilege of requesting Your Excellency to inspect the portraits of our past Presidents which I have collected for the purpose of hanging them on the walls of this memorable building. You will find among these Sir William Jones' portraits in various stages of his life: as a boy by Reynolds, as a young man by Home, as he appears in a vignette already mentioned, as he appears in the frontispiece of the *Asiatic Museum illustrated*, part I, as he appears in a marble bust in this hall, and as he appears in Lord Teignmouth's work on his life. Let me add that Sir William Jones still lives as the inspiring genius guiding the Society in all its activities.

> 'Unbounded learning, thoughts by genius framed
> To guide the bounteous labours of his pen,
> Distinguished him, whom kindred sages named,
> "The most enlightened of the sons of men."'

The portraits of our other past Presidents are complete except for a few which we still hope to obtain in the future.

FAREWELL TO HIS EXCELLENCY THE GOVERNOR OF BENGAL.

Your Excellency, it is now my duty to bid you farewell, on behalf of this Society. Your keen interest in our Society is well known to our Council. In spite of various calls upon your time, you have generously consented to preside repeatedly over our annual meetings. As Patron of our Society, you have helped us financially and encouraged us morally. We hope you will carry with you the memory of your association with the oldest Asiatic Society of India, which was started by an Englishman, and which, as I stated in my first presidential speech and in an earlier part of the present one, should cement the friendship between your countrymen and mine. We assure you that politics do not find a place in our Society, we still hold that Societies like ours always stand for blessed peace. We shall never forget your courteous dealings with us, your love for our Society, and your solicitude for its welfare. We wish you and Lady Jackson *bon voyage*, and bid you 'good-bye', which in the language of the old Saxons of your country means 'God be with you'.

YOUR EXCELLENCY, LADIES, AND GENTLEMEN,

I feel proud that I have been judged worthy to occupy, as President or acting President, an office which is associated with the names of so many great men who have honoured our country and I thank you for the confidence that you have reposed in me.

In closing I wish to express my heartiest thanks to my good friend and colleague, Mr. Johan van Manen, the General Secretary, who has always given me his unstinted and capable assistance in the same manner as, for the last nine years, he has served the Society in manifold ways to the greatest advantage.

With these remarks I vacate my office in favour of my learned successor who I hope will be the nominee of the Council, Mr. Justice C. C. Ghose. His reputation is well-known to all of us. May the Society prosper under his able guidance.

U. N. BRAHMACHARI.

1st *February*, 1932.

PATRON'S ADDRESS.

SPEECH BY HIS EXCELLENCY SIR STANLEY JACKSON, GOVERNOR OF BENGAL, AT THE ANNUAL MEETING OF THE ASIATIC SOCIETY OF BENGAL, ON THE 1ST FEBRUARY, 1932.

MR. PRESIDENT, LADIES, AND GENTLEMEN,

It is always a pleasure to me to attend the deliberations of this learned Society, but this year the pleasure cannot but be dimmed by the grief which we all feel at the circumstances which have occasioned the absence of the outgoing President, Colonel Seymour Sewell. We condole with him very sincerely in the loss which he has suffered. His charming and kind-hearted lady was not only beloved by all who knew her but was a true helpmate to him in his every undertaking and pursuit. It was her custom, also, as I understand, to perform for the Society many little domestic services of a kind which only a woman can render. We regret further that the abolition, for reasons of high financial policy, of the post which Colonel Sewell has so brilliantly held, renders it unlikely that we shall see him back among us. It is all the more satisfactory, therefore, that the Society should have been able to mark its high esteem of Colonel Sewell's scholarship by the award to him this year of the coveted Barclay Memorial Medal, the recipients of which furnish an array of names of the highest scholarly merit.

We may congratulate ourselves that, for the second time, Dr. Brahmachari was available to step into the breach and to officiate as President when the news of his wife's illness took Colonel Sewell to England. I think we owe a debt of gratitude to Dr. Brahmachari for his most interesting and valuable address. The unabridged copy, which I have had the pleasure of studying, is full of good matter and I can only express the hope that his eloquent plea for a reprieve for the scientific departments of the Government of India which are threatened with the headman's axe will reach the ears for which it is intended.

The hand of death has been busy in the ranks of the Society during the year under review, but even in the melancholy matter of its losses I think we may claim that a fine aspect of the Society's constitution finds illustration,—namely, the stability of its core and the sustained loyalty of its members. That among the 10 members who died during the year no less than six had been connected with the Society for over 25 years and one for over half a century is in itself a striking demonstration of the attraction of the Society for genuine scholars and a welcome corrective of a perspective which might otherwise have suffered distortion in a year when bad items have brought us a net loss of 77 members.

By the death of my old friend Pandit Hara Prasad Shastri the Province has lost a distinguished Sanskritist who for nearly half a century has been an international name and whose place it will be hard to fill. He was engaged upon his great work for the Society,—the cataloguing of our vast store of Sanskrit manuscripts,—up till almost the day of his death. Sir Richard Temple, who joined the Society so far back as 1878, was a servant of the Empire and a servant of learning,—equally distinguished in both spheres of a rich and mellow life. His Highness the Maharaja of Benares, whose hospitality I enjoyed for a few hours only last July, was an example of those enlightened Princes who, true to the Indian tradition of reverence for erudition, are not prevented by their exalted position from sharing in the labours of a simple Society of Learning.

The real value of a learned Society like ours lies in its scholarship and in its published works. Nevertheless its prestige is also reflected in the social sphere and it is, I think, worth remarking that a Society must be representative of considerable all-round distinction which numbers among its members six of the new Knights and three of the new C.I.E.'s of the year.

By honouring its predecessors the living generation honours itself, and we must all be grateful to Dr. Brahmachari for his initiative, imagination, and zeal in collecting an almost complete set of pictures of the 50 or so distinguished scholars and friends of learning who have presided over this ancient Institution since its inception nearly a century and a half ago. Dr. Brahmachari's interest in the past history of the Society is well known, but one can easily appreciate the time and labour that have gone to the collection of a picture gallery of likenesses of men whose service in India stretches back so far. I congratulate the Society on this acquisition so generously presented by the outgoing President in honour of his predecessors: it will be a great pleasure to me presently formally to inaugurate this gallery. I regard it as a collection of great historical value for the Society, for Calcutta and, indeed, for scholarship in general. I cannot refrain also from a reference to the generous act of my friend, the Hon'ble Sir B. L. Mitter, in presenting to the Society in original a document of considerable historical interest to India—the 'Full Power' granted to him by His Majesty under the Great Seal of England constituting him His Majesty's Plenipotentiary at the 12th Assembly of the League of Nations.

The Annual Report tells a tale of another year's work well done, in spite of adverse conditions due to lack of funds. The cataloguing and indexing of the proceedings of the Council is a work which cannot fail to be of value to the Society in the future and good progress is reported with other work in hand. Both in the Annual Report and in the Presidential address the financial problems before the Society have been given insistent and detailed expression. This is only right, for needs will never be met as long as they remain inarticulate, and learning, art and philanthropy should clearly put their difficulties before the world. None of us, I think, but must be impressed by the exposition which our learned President has given of the regrettable results, not only to the Scientific Government Departments concerned but in particular to the Asiatic Society, of financial stringency and consequent retrenchment, public and private. I feel that the appeal made to us and through us to wider circles, public and private, will not be altogether in vain. There is so much that this Society can do for the advancement of pure scholarship and the diffusion of knowledge: we have the raw material, I might almost say ' by the ton ', in our archives: we have the expert knowledge among our members to sort out, annotate, classify that raw material and make it available to the wider public of the reading world. You may say ' Why not set the experts on to work on the raw material ? ' Well, one of our chief difficulties is the almost prohibitive cost of printing,—especially printing of the kind I have in mind. It is a very costly thing nowadays to render the fruits of scholarship available for general consumption. Then again take the possibilities of an extension of the Society's exchange list. I can think of no way in which the Society could better extend the scope of its own influence, while benefiting by the labours of similar bodies elsewhere, than by a wide exchange of its publications. But, as the Council have shown in the Annual Report, such an extension is hardly possible so long as the printing of the Society's papers has to be financed from current receipts. In difficult times like these we cannot hope for an extension of our membership; and membership fees and Government grants, as the experience of the last few years has once again emphasized, are a very insecure basis on which to run the activities of a Society of this kind. As I said last year,—what the Society needs, if its main activities are to be put on a sound basis, is a Permanent Endowment Fund,—a matter of several lakhs of rupees. We cannot look to a subscription campaign for this. We can but hope that some of those who are well endowed with this world's possessions, either from among our membership or outside it, will recognize the great work which this Society has already achieved and the greater work for which the potentialities exist, and will come forward with a really princely donation to the General Reserve Fund of the Society. At a time when unprecedented difficulties have arisen in this country, making for misunderstanding between those who have come to this ancient land from across the seas and those who have been born under its generous skies, I have no hesitation in addressing my appeal to Europeans and Indians alike. In the Presidential address a most happy reference has been made to an old emblem used by the Society and to the ideals in the mind of Sir William Jones himself,—both indicative of the true fraternity which should and which can exist between East and West and between the great sections of the population of the country itself. 'Reason is one and common to all.' In the republic of letters we are all equal, and because true equality lies in the intellect, the Society has not only its primary scholarly aims, but has, as a natural concomitant of such aims, a spiritual aspect as a peacemaker. Learning and wisdom are essentially peacemakers, and I would hope that this Society would not only maintain but increase its peaceful mission of true unification of all mankind in this sub-continent. The times, then, call for recognition of the work for peace which Societies of this kind cannot but perform if they remain true to their ideals. Is it too much to hope that that recognition will be forthcoming at the hands of the richly endowed and generously minded who are willing to place their country and posterity under an obligation ?

I have to congratulate our new President on the distinction conferred upon him by this meeting, and I congratulate the Society also on the distinguished President it has gained for the year. By this choice the Society reverts to an old practice which has now been in abeyance for many years. Sir Charu Chunder Ghose acted as Chief Justice of Bengal last year: from the year 1797 to the year 1858 no less than six Chief Justices of Bengal occupied the Presidential Chair. I am confident that our new President will follow with distinction the footsteps of his illustrious predecessors. As the Annual Report has reminded us, the year is not likely to be without its problems and its difficulties. The President will certainly require our full support. I can promise him, I am sure, the co-operation of a keen and single-minded Council and the willing assistance of the all-pervasive and ever-cheerful General Secretary to whom the Society owes so deep a debt of gratitude.

Gentlemen, this is the last occasion on which I shall be present at an Annual Meeting of the Society. I thank you, Dr. Brahmachari, for the kind way in which you have alluded to my connection with the Society. It is one of the redeeming features of an arduous and not always entirely happy official position that the Governor, by virtue of his office, is accorded an entrée into many domains of culture and of learning whose doors are only opened to others after hard years of approved apprenticeship. I shall always look back with pleasure on the all too brief period of my active connection with this learned Society. I wish you good-bye and Godspeed.

OFFICERS AND MEMBERS OF COUNCIL, ASIATIC SOCIETY OF BENGAL, 1932.

Elected and announced in the Annual Meeting, 1st *February,* 1932.

President.

The Hon'ble Mr. Justice C. C. Ghose, Kt., Barrister-at-Law.

Vice-Presidents.

Lt.-Col. R. B. Seymour Sewell, M.A., M.R.C.S., L.R.C.P., Sc.D. (Cantab.), F.L.S., F.Z.S., I.M.S., F.A.S.B.
L. L. Fermor, Esq., O.B.E., D.Sc., A.R.S.M., F.G.S., M.Inst.-M.M., F.A.S.B.
Sir R. N. Mookerjee, K.C.I.E., K.C.V.O., Hon. F.A.S.B.
Lt.-Col. R. Knowles, B.A. (Cantab.), M.R.C.S., L.R.C.P., I.M.S., F.A.S.B.

Secretaries and Treasurer.

General Secretary :—Johan van Manen, Esq., C.I.E., F.A.S.B.
Treasurer :—James Insch, Esq.
Philological Secretary :—C. W. Gurner, Esq., B.A. (Oxon.), I.C.S.
Joint Philological Secretary :—Shamsu'l 'Ulama Mawlawi M. Hidayat Hosain, Khan Bahadur, Ph.D., F.A.S.B.
Natural History Secretaries.
  Biology :—Dr. Baini Prashad, D.Sc., F.Z.S., F.R.S.E., F.A.S.B.
  Physical Science :—Dr. W. A. Jenkins, D.Sc. (Sheffield), I.E.S.
Anthropological Secretary :—Rev. P. O. Bodding, M.A., F.A.S.B.
Medical Secretary :—Rai Upendra Nath Brahmachari, Bahadur, M.A., M.D., Ph.D., F.A.S.B.
Library Secretary :—Dr. B. S. Guha, M.A., Ph.D. (Harvard).

Other Members of Council.

Sir J. C. Coyajee, Kt., B.A. (Cantab.), LL.B., I.E.S.
M. Mahfuz-ul Haq, Esq., M.A.
Sir David Ezra, Kt., F.Z.S., M.B.O.U.
L. R. Fawcus, Esq., B.A. (Cantab.), I.C.S.
Percy Brown, Esq., A.R.C.A.

EXHIBITION ANNUAL MEETING.

LIST OF EXHIBITS SHOWN AFTER THE ANNUAL MEETING OF THE ASIATIC SOCIETY OF BENGAL, ON THE 1ST FEBRUARY, 1932.

1. A. F. M. ABDUL ALI, IMPERIAL RECORD DEPARTMENT.

Miscellaneous Historical Documents.

(1) Letter from Colonel Clive dated 24 Feb., 1757, giving encomiums to Admiral Watson for his services rendered to the East India Company. (Mily. Dept. Cons.)

(2) Letter from Admiral Watson dated 27 Feb., 1757, stating that he is ready to go to Madras if any occasion arises for his Military Assistance. (Mily. Dept Cons.)

(3) Account of the French Squadron destined for India in 1759. (Mily. Dept. Cons.)

(4) List of persons offering to Farm the Calcutta Perganas with their terms. (Pub. A. 28 Oct., 1765, No. 1.)

(5) Lord Clive's letter signifying his intention of appropriating the legacy of 5 lacs left by Mir Jafar as a fund for invalids in the Company's service and for the widows of Company's servants. (Pub. A. 14 Apr., 1766, No. 2.)

(6) Governor-General's note directing the Secretary to amend the resolution of the Board regarding the Official correspondence of the Judges by erasing the clause which limited the exemption from postage to letters marked on the service and by substituting the Judges' signatures for their seals in franking letters. (Pub. Con. 6 Nov., 1777, No. 1.)

(7) Letter from Mr. William Larkins, Accountant General, applying for leave to draw the same salary and emoluments as the Secretary to the Revenue Dept. (H. D. Pub. B. 29 Dec., 1777, No. 1.)

(8) Minutes of the Members and of the Governor-General on the above letter. (H. D. Pub. B. 29 Dec., 1777, No. 2.)

(9-10) Governor-General's minute assenting to an increase in the supply for the investment of raw silk. Minute of Messrs. Edward Wheler and Philip Francis, acquiescing in the proposed increase. (H. D. Pub. B. 2 Jan., 1778, Nos. 4 and 5.)

(11) Text and translation of an address from the principal members of the Greek Church eulogising the administration of Warren Hastings. (H. D. Pub. B. 9 Jan., 1789, No. 21 and K. W.)

(12) Minute of the Governor-General on the proposed communication between the Ganges and the Hughli, desiring that the Advocate General may be consulted on certain points relating to the Tolley's *nulla*. (H. D. Pub. B. 23 Jan., 1795, No. 2.)

(13) Minute of the Governor-General, regulating the salaries and allowances to be drawn by the writers. (Pub. B. 13 Apr., 1795, No. 1.)

(14) Letter from Mr. C. E. Carrington, Secretary to the Asiatic Society, to Mr. G. H. Barlow, requesting that a plot of

land be granted for the erection of a house to hold the meetings of the Society and for the establishment of a library and a museum. (H. D. Pub. A. 16 Jan., 1798, No. 16.)

(15) Governor-General's minute proposing that it may be notified to the public that the principal as well as the interest on the 12 per cent. notes granted at the Presidency should be received as subscription towards the decennial loan, etc. etc. (H. D. Pub. A. 26 July, 1798, No. 1-L.)

(16) Minute of the Governor-General making new arrangements in the Secretariat offices. Board's resolution on the same. (H. D. Pub. A. 29 Oct., 1799, No. 1.)

(17) Extracts from the minutes of consultation making the above appointments. (H. D. Pub. A. 29 Oct., 1799, No. 2.)

(18) Advertisement inviting subscriptions to the 8 per cent. loan. Form of the promissory note to be issued for the above loan. (H. D. Pub. A. 29 Oct., 1799, No. 3.)

(19) Letter from Mr. W. Hunter, Secretary to the Asiatic Society, to Mr. H. G. Barlow, Chief Secretary to Government, requesting permission to send to England free of duty some copies of the sixth volume of the 'Asiatic Researches' by outgoing boats. (H. D. Pub. B. 14 Mar., 1800, No. 156.)

(20) Restoration of the Danish Settlements on the Coromandel Coast. (For. Cons. 6 July, 1816, Nos. 1-2.)

(21) Governor-General's minute proposing the experiment of a Copper currency. (H. D. Pub. A. 30 July, 1778, No. 8.)

(22) Minute of Mr. Aldersey suggesting the ready money purchase of 2 or 3 lakhs of fine Dacca cloths. (Home Dept. Pub. Cons. 28 Jan., 1773, No. 2.)

(23-24) Mr. Barwell's minute objecting to the above. Minute of the President on the above. (H. D. Pub. A. 28 Jan., 1773, Nos. 3-4.)

(25) Minute by Mr. Hugh Watts regarding the establishment of a Gold currency. (H. D. Pub. A. 9 June, 1766, No. 1.)

(26) Copy of Notice regarding the establishment of a Gold currency. (H. D. Pub. A. 28 July, 1766, No. 12.)

(27) Treaty with King Christian VIII of Denmark for transferring the Dutch Settlements in India to the English, dated 22 Feb., 1845.

(28) Illuminated Persian letters, showing various styles.

(29) A book exhibited as a fine specimen of inlaying work. This book was hopelessly damaged by larvæ.

2. BANGIYA SAHITYA PARISHAD.

Miscellaneous Antiquities.

(1) A wooden seat, painted.

(2) A Manuscript cover, engraved.

(3) A Manuscript cover, painted.

(4) Ten Playing Cards from Bishnupur.
cf. H. P. Shastri, Note on Bishnupur Circular Cards. J.A.S.B., 1895, Vol. 64, part 1, page 284.

(5) A Deed (sale of a man for Rs. 12) in 1195 B.S. (1788 A.D.).
cf. M. N. Basu, Prabasi 1329, Jaistha.

(6) Autograph of Raja Rammohan Roy (signature on cheque).

(7) Autograph of Rani Bhabani (signature on a Deed of Gift. December, 1796).

(8) Autograph of Bankim Chandra Chatterji. A letter.

(9) A petition in the handwriting of poet Bharat Chandra Ray

Gunakar with orders passed on it by Maharaja Krishna Chandra Roy.

(10) A Bengali Book in Nagri characters. A Manuscript of Manasa-Mangal by Kshemananda, 1263 B.S.

3. KALIPADA BISWAS.

A collection of the snakes of the Royal Botanic Garden, Calcutta.

The snakes exhibited are some of the common ones found and preserved for some time past. One of the bottles contains a young cobra and a centipede, both dead as a result of a fight with each other. Snake-bite cases, however, in the garden are very rare. The snakes are predominant during the rains.

The snakes collected are:—Lycodon aulicus, Dendrophis pictus, Typhlops diardi, Vipera russellii, Polyodontes sagittarius, Bungarus cæruleus, Oligodon dorsalis, Naia naia, Simotes arnesis, Dryophis mycterizans, Enhydrina valakadien. The most common of these are Rat snake, Carpet or Grass snake, Green snake, Krait, Cobra, and Russell's Viper. Of particular interest is the venomous sea-snake finding its way in the river Hooghly. Black cobras have also been observed to reside on the palm trees. An interesting incident,—a frog swallowing a chicken,—was observed by Mr. C. C. Calder, Superintendent, Royal Botanic Gardens, a few years ago.

The snakes have been identified by Mr. G. E. Shaw and Dr. B. Prashad.

4. MISS M. L. CLEGHORN.

(1) *Mulberry Silk Industry.*

Specimens and photographs illustrating this important Cottage Industry in Bengal.

(2) *Four heavy yielding varieties of Tree Mulberry.*

Specimens of four sub-varieties of mulberry. These specimens are heavy yielding strains and are of value from the sericultural viewpoint.

5. MISS OLIVE CLEGHORN.

Eri Silk Industry for Bengal.

Specimens and photographs illustrating this valuable Cottage Industry from the eggs to the fabric.

6. M. D. DARBARI.

(1) *Qur'ān.*

A very beautiful copy of the *Qur'ān* written in an elegant Naskhī hand by a skilled calligraphist of the early 16th century, A.D. The text is enclosed in gold, orange and blue rulings, with decorative hands as captions at the beginning of each *Sūra*. There are six richly illuminated pages at the beginning, followed by several ornamented leaves at the end. An interlinear Persian translation of the text is given in red ink.

The *Ḥās͟hiya*, or border, contains the well-known Persian commentary, *Tafsīr-i-Husaynī*, which was composed in 899 A.H. (1494 A.D.).

(2) *Coffee Pot.*

A copper coffee pot engraved with floral designs and with an inscription.

7. H. C. Das-Gupta *and* A. Sen.

Serial sections of Lonsdaleia canalifera *Mans, obtained from the Productus limestone beds of the Salt Range, showing the mode in which the septa have been developed.*

Seven photographs and one drawing showing the following features in the development of septa :—

Fig. 1. A newly born corallite, where a few septa are developed before the completion of the epithecal ring.
,, 2. The corallite in the last phase of neanic stage, where out of 28 septa, 3 reach the columella.
,, 3. The corallite in ephebic stage with 32 septa, of which 16 comparatively thicker ones alternate with the thinner septa.
,, 4. 38 septa in all, of which 19 are thicker and alternating with the thinner ones. Eight of the thinner septa branch trichotomously.
,, 5. A septal arrangement where there are 5 cases of primary, 7 of secondary, and 1 of tertiary branching.
,, 6. A septal arrangement with 6 cases of primary, 5 of secondary, and 4 of tertiary branching. One of the tertiary branches shows a further branching of quarternary type.
,, 7. The fully developed corallite, with 6 cases of primary, 5 of secondary, 5 of tertiary, and 2 of quarternary branching. In the entire corallite, there is a single thin septum which does not branch.

Drawing. The branching of the septa diagrammatically.

(The whole work was carried out by A. Sen at the suggestion and under the direction of H. C. Das-Gupta.)

8. GEOLOGICAL SURVEY OF INDIA.

(1) *The new Geological Map of India.* Scale 1 inch = 32 miles.
(2) *A set of Tin and Wolfram ores from Tavoy, Burma.*
(3) *A set of polished Indian Stones.*
(4) *A set of Burmese jade, from Tawmaw, Myitkyina District, Burma.*
(5) *Specimen of Tawmawite (Chromium-bearing Epidote), from Tawmaw, Burma.*
(6) *A method of distinguishing between Ruby and Spinel.*

Ruby is anisotropic, and appears illuminated in doubly polarised light; while spinel remains dark.

(7) *Cast of the skull and mandible of* Baluchitherium.

This animal, believed to be the ancestor of the Rhinoceros, is probably among the largest known land-animals that have ever inhabited the earth. This fossil is from the early Miocene of Baluchistan.

(8) *The Evolution of the Elephant.*

A series of specimens showing the evolution of the molar teeth of the elephant, with a dissected specimen showing the complex internal structure.

(9) *Polished specimens of fossil Ivory.*

From the Miocene deposits of the Rawalpindi District. The tusks of the prehistoric elephant to which this specimen belonged reached a length of 11 feet, and had a thickness of 1½ feet at the socket.

(10) *Pieces of opalised fossil wood.*

From the Irrawaddy system of Burma.

9. JAMES INSCH.

A small collection of choice Chinese ivory carvings, together with a few Indian, Japanese, and Italian specimens for comparison.

10. M. MAHFUZ-UL HAQ.

(1) *Manuscripts.*

(*a*) *Dīwān-i-K̲h̲āksār.* A unique copy of the Persian *Dīwān*, or the collection of Poems, of Nawwāb S̲h̲ukr-ullāh K̲h̲ān, *K̲h̲āksār*, a well-known official of the court of the Emperor Aurangzib. The MS. contains additions, emendations, etc., in the poet's own hand.

(*b*) A copy of 'Aṭṭār's *Tad̲h̲kirat-ul-Awliyā*, or the Biography of Saints, written in beautiful *Nask̲h̲* in the 9th century *Ḥijra.* This valuable copy once belonged to the library of 'Abdur Raḥīm, K̲h̲ān K̲h̲ānān, the great general of Emperor Akbar, whose autograph note it bears.

(*c*) A copy of 'Ali Yazdī's very rare *Ḥulal-al-Muṭarraz* (written in fine Nasta'līq), which once belonged to the Barīd S̲h̲āhī Kings of Bīdar (897–1018 A.H., 1492–1609 A.D.). On the occupation of Bīdar by Ibrāhīm 'Adil S̲h̲āh II of Bījapūr, the manuscript entered the library of the 'Adil S̲h̲āhī Kings and was later taken away by Emperor Aurangzīb, in 1097 A.H.

There are several seals of the Deccan Kings and of Emperor Aurangzīb and others, besides notes and *'Arḍ-dī das* in the handwriting of the Mughal librarians.

(*d*) A copy of Sanā'ī's *Ḥadiqat-ul-Ḥaqīqat*, transcribed by Saiyyid Jamāl bin Saiyyid Muḥammad al-Ḥusaynī, a calligraphist of the 10th century *Ḥijra.* The manuscript once belonged to the library of Prince Parwīz, an elder brother of Emperor Shāhjahān. No other manuscript bearing the seal of the Prince is known to exist.

(2) *Specimens of Calligraphy.*

(*a*) A *Waṣlī*, signed by Mīr 'Alī al-Kātib, the court calligraphist of the Timurids of Persia (died C. 957 A.H.).

(*b*) A *Waṣlī*, signed by Mīr 'Alī al-Ḥusaynī, probably identical with the former.

(*c*) A *Waṣlī* signed by Sulṭān 'Alī al-Kātib who 'is acknowledged to have brought the art of *Nasta'līq* calligraphy to its highest perfection' (died C. 921 A.H.).

(*d*) A *Waṣlī* transcribed by Mālik ad-Daylamī, the teacher of Mīr 'Imād—the greatest calligraphist of Persia.

[No specimen of Daylamī's calligraphy is known to exist in any public library in India.]

(*e*) A *Waṣlī* transcribed by Saiyyid 'Alī al-Ḥusaynī, who came to India at the instance of Emperor S͟hāhjahān to train Aurangzīb in the art of calligraphy. Later he obtained the title of *Jawāhir Raqam* from Emperor Aurangzīb (dated, Iṣfahān, 1058 A.H.).

(*f*, *g*) Two illuminated pages from a Persian Manuscript.

11. JOHAN VAN MANEN.

The Tao Te King in Europe.

A collection of editions and translations of the Tao Te King, together with a selection of books and essays on Lao Tsze.

Translations :—

(1) *French.*

Pauthier (1838), Julien (1842), de Ĥarlez (1891), de Pouvourville (1894, 1907), Ular (1902), Besse (1909), Wieger (1913), Salet (1923).

(2) *English.*

Chalmers (1868), Balfour (1884), Legge (1891), Old (1894, 1905, 1922), Alexander (1895), Carus (1897, 1898, 1913), Kingsmill (1899), Heysinger (1903), Parker (1904), Medhurst (1905), Lionel Giles (1909), Mears (1916, 1922), Borel, translated (1919), 'Shrine of Wisdom' (1924), MacInnes (1927).

(3) *German.*

Von Plaenckner (1870), Von Strauss (1870, 1924), Noak (1888), Hartmann (*n.d.*), Kohler (1908), Grill (1910), Wilhelm (1911, 1921), Ular (1912, *n.d.*), Dallago (1915, 1927), Federmann (1921, 1926), Heckel (1922, 1923), Wyneken (1922), Hahn (1924), Böttger (*n.d.*), Weiss (*n.d.*).

(4) *Dutch.*

Borel (1898, *n.d.*), Van Manen (1898–1900), Blok (1910, *n.d.*).

(5) *Italian.*

Evans (1924), Castellani (1926).

(6) *Russian.*

Konissi (1913).

(7) *Bulgarian.*

Translation from de Pouvourville (1914).

(8) *Czech.*

Čupr (1878).

(9) *Swedish.*

Folke (1908).

Altogether about 40 different translations, in 9 languages, and representing 60 different editions. Some of the translations are retranslated from other European languages.

Added are 12 editions of the original Chinese text, mostly published in China and a few in Japan. Of the former 4 belonged to Legge's library.

Further added are 40 works and pamphlets on Lao Tsze and Taoism in various languages.

12. H. K. MOOKERJEE.

Alizarine preparation of transparency of the whole Skeletal Structure

(1) Newt (Triton cristatus).
(2) Frog (Rhacophorus maximus).
(3) Small Toad (Microhyla rubra).
(4) House Lizard (Hemidactylus flaviviridis).

13. THE GENERAL SECRETARY.

(1) *The Society's publications of* 1931.

(*a*) Bibliotheca Indica.
(*b*) Catalogues.
(*c*) Journal.
(*d*) Proceedings, Indian Science Congress.

(2) *Some acquisitions of interest to the Library during* 1931.

(*a*) Presentations.
(*b*) Purchases.

(3) *Some recent publications by Members of the Society.*

George N. Roerich: Trails to Inmost Asia. New Haven, 1931.

Hem Chandra Ray: Dynastic History of Northern India. Vol. 1. Calcutta, 1931.

G. Tucci: Doctrines of Maitreyanatha and Asanga. Calcutta, 1930.

Sir Aurel Stein: An Archæological Tour in Gedrosia. Calcutta, 1931.

Girindra Nath Mukhopadhyaya: Lathyrism; or Khesari Dal Poisoning. Calcutta, 1929.

Sarat Chandra Roy: Oraon Religion and Customs. Ranchi, 1928.

Sir E. Denison Ross: The Persians. Oxford, 1931.

Suniti Kumar Chatterji: A Bengali Phonetic Reader. London, 1928.

Bimala Churn Law: Buddhistic Studies. Calcutta and Simla, 1931.

S. C. De: Stray Thoughts. Calcutta, *n.d.*

N. P. Chakravarti: L'Udanavarga. Sanskrit. Vol. 1. Paris, 1930.

(4) *Catalogue of Sanskrit Manuscripts in the Society's Collections, by MM. Haraprasād Shāstri.*

(5) *Persian text of the Ma'āṣir-i-Raḥīmī, edited by Mawlavi M. Hidayat Hosain.*

Completed during the year. One of the largest works in the *Bibliotheca Indica*, 3,291 pages; 3 volumes; in progress from 1910 to 1931.

(6) *The Oxford New English Dictionary.*

Twelve quarto volumes. Presented to the Society by Mr. James Insch. A small dictionary of the English language added: David and Goliath.

(7) *Some interesting books from the Society's Library.*

(*a*) Plato: Platonis Opera; lib. II. Venetiis, 1513.
(*b*) Julius Firmicus: Julii Firmici Astronomicorum libri octo integri, etc. etc. Venice, 1497.
(*c*) Ambrosius Paraeus: Opera Chirurgica. Francofurti ad Mœnum, 1594.
(*d*) M. Tullius Cicero: Opera Omnia. Parisiis, 1596.
(*e*) Francis Buchanan Hamilton:

1. Zoological Manuscripts. 2 Vols., 1815.
2. Zoological Drawings. 4 Vols. *n.d.*
3. Autograph Manuscript. The fishes of lower Bengal (Latin), dated Baripur, January, 1800. Presented by Dr. Gilbert P. Whitley, Ichthyologist of the Australian Museum, Sydney.

(8) *Full Power granted by His Majesty the King Emperor to Sir Brojendra Lal Mitter.*

This remarkable document signed by His Majesty and sealed with the Great Seal was granted to Sir B. L. Mitter, Law Member, Viceroy's Council, and formerly a Council Member of the Asiatic Society of Bengal. The document constitutes Sir B. L. Mitter, His Majesty's Commissioner, Procurator and Plenipotentiary in respect of the Empire of India at the 12th Assembly of the League of Nations at Geneva. In this document Sir B. L. Mitter was invested with full power and authority to treat, adjust, and conclude any Treaties, Conventions, or Agreements on His Majesty's behalf.

Generously presented to the Society by Sir B. L. Mitter.

(9) *Publications on Tibetan subjects by M. Jacques Bacot.*

(10) *Karen Drum.*

From Upper Burma. Animal and geometrical ornamentation.

14. QAZI 'UBAID-UL-BARI (THROUGH MR. M. MAHFUZ-UL-HAQ)

Astronomical Globe on Stand.

It was made by one of the court astronomers of the Emperor Jahangir. Signed: '*The work of Qa'im Muhammad, son of 'Isa, son of Ilahdad the Astrolobe-maker—*(*a descendant of the court astronomers*), *of Humayun, in* 1034 A.H. (1624-25 A.D.), *the* 21*st Regnal Year of* (*the Emperor*) *Jahangir.*'

A similar Astronomical globe made by Ziya-ud Din Muhammad, a son of the maker of the present globe, was exhibited at the Persian Art Exhibition, London (Gallery VII, Case 309, No. B).

15. MRS. PAXTON (THROUGH MR. M. MAHFUZ-UL HAQ).

Pitcher, with engraved arabesque ornament in geometrical compartments, floral scrolls, etc.

It is inscribed with six Persian verses in good *Nasta'liq* character. It was made for one (Muhammad) Baqir in 1091 A.H. (1680 A.D.).

16. MESROVB JACOB SETH.

(1) *Cabinet of Alexander the Great, gold and silver coins; also Parthian, Sasanian, Indo-Greek, Moghul Nadir Shah, Armenian ancient coins.*

(2) *A set of five Indian ivory carvings.*

(3) *Two powdered blue and gold jars.*

ANNUAL REPORT FOR 1931.

The Council of the Asiatic Society of Bengal has the honour to submit the following report on the state of the Society's affairs during the year ending the 31st December, 1931.

1. Ordinary Members.

(1) *Totals.*—The calculated total of Ordinary Members on the roll of the Society at the close of 1931 was 519 as against 596 at the close of 1930, a net decrease of 77 during the year. This is not only the third decrease in membership to be recorded after an uninterrupted and rapid growth for a consecutive period of five years, but a decrease greater than any in the last 60 years of the Society's existence, and only paralleled three or four times in the entire long history of the Society. At the end of the year the membership total was almost equal to that at the end of the years 1911 and 1912, before which time it never has surpassed the final total of the present year, which has only been greater between 1926 and 1930.

(2) *Gains and losses.*—These were as follows during the year:—

Gains.		*Losses.*	
Old elections carried forward	2	Elections lapsed ...	4
New elections ...	19	Deaths	10
Resignation withdrawn ...	1	Resignations	69
		Rule 38	10
		Rule 40	6
Total ...	22	Total ...	99

Initial total 596; net loss 77; final total 519.

(3) *General.*—The heavy loss in membership during 1931 is undoubtedly due to the general financial world crisis. Many have been the letters of regret received from resigning members who expressed their disappointment at having to reduce their subscription lists owing to heavy taxation, reduced income, and in several cases loss of position. At the same time the number of new admissions, 19, is the lowest on record for over quarter of a century. In 1903 the new admissions were also 19 and before that the year 1897 is the latest year in which the number was lower, namely, 16.

The number of resignations, 69, has never been surpassed in the whole history of the Society. As no one can foretell the length of the period of universal economic depression under which the world is suffering, we cannot be unduly optimistic concerning the immediate future and the Society has to prepare for a further diminution in membership during the next year. It is most fortunate that what may be termed a reserve of membership has been built up during a period of three years from 1926 to 1928, so that we have still a margin left before our totals fall below the average of the last 60 years. It cannot, however, be held that the general position and outlook give reasons for satisfaction.

(4) *Rule* 38.—This Rule, dealing with members whose subscriptions are in arrears, was again strictly applied, and the names of ten members were consequently removed from the roll for this cause.

In the Annual Report it has been repeatedly mentioned that there is a considerable amount of laxity in this matter. Certain members allow their subscriptions to fall in arrears without taking the trouble to send in their resignations. As a result they have, under the rules, to be removed from the membership register in a way not at all dignified. Consequent on such procedure is considerable trouble for both the Treasurer and the Secretary. Quite apart from all this, the defaulting member handicaps himself severely with regard to any future re-entry in the Society, for he can, under the rules, only be reinstated as a member by a resolution of a general meeting, on payment of all arrears and such further subscriptions as he would have been chargeable with under the rules if his membership had continued.

(5) *Membership List.*—The customary detailed cross-check of the membership lists with the membership card index was made at the end of the year. This is a necessity to ensure reliable statistics.

(6) *Non-resident Members.*—Their total at the end of the year was 184, leaving still room for great expansion.

(7) *Life-members.*—The total of our life-members has remained the same, namely 52. One was lost by death; and one compounded during the year. We once more press upon the older members of about 20 years' standing, or over, the desirability of compounding for a life-membership. After such a long participation in our work the compounding fee is relatively small, and a most valued asset to the Society is the continued presence in its ranks of those old friends and colleagues who have so long shared its labours and have helped to bear its burdens. Especially those who after an honourable career in India retire to Europe should maintain their connection with the Society at a relatively small cost to themselves but to the great satisfaction of those who continue the work in India.

(8) *Deaths.*—This year the loss to the Society by death has been heavy and especially grievous. Amongst the distin-

guished and especially valued members lost to us, whose memory will be cherished, and for whose departure the Society is the poorer, the following may be mentioned:—

Col. Sir Richard Carnac Temple (Fellow, 1928; Ordinary Member, 1878).
MM. Dr. Hāraprasād Shāstri (Fellow, 1910; Ordinary Member, 1885).
B. L. Chaudhuri (Fellow, 1921; Ordinary Member, 1893).
H.H. Maharaja Sir Prabhu Narain Singh (Life Member, 1899).
Jateendranath Mukherji (Ordinary Member, 1899).
Jogindranath Sen (Ordinary Member, 1902).
M. N. Bannerjee (Ordinary Member, 1925).
James Peddie (Ordinary Member, 1927). Assassinated.

2. Associate Members.

(1) During 1931 no new Associate Members were elected and none were lost.

(2) The present number stands at 8; statutory maximum 15.

3. Special Honorary Centenary Members.

(1) Our only surviving Special Honorary Centenary Member still remains with us.

4. Institutional Members.

(1) During the year three Institutions were admitted to this class of membership. They were:—

The Benares Hindu University, Benares.
The Otani University Library, Kyoto, Japan.
The Annamalai University Library, Annamalainagar, Chidambaram, S. India.

(2) Their total number is 5.

5. Ordinary Fellows.

(1) At the Annual Meeting held on the 2nd February, 1931, the following three Members were elected Ordinary Fellows:—

S. Krishnaswami Aiyangar.
R. N. Chopra.
R. B. Whitehead.

(2) Three Fellows were lost by death:—

MM. Hāraprasād Shāstri (1910).
Dr. B. L. Chaudhuri (1921).
Lt.-Col. Sir R. C. Temple (1928).

(3) One Fellow was lost by resignation:—

H. H. Haines (1915).

(4) At the end of 1931 the number of Ordinary Fellows was 46; statutory maximum 50.

(5) During the year certain modifications were made in the regulations regarding the election of Fellows, necessitated by the fact that the number of Fellows on the roll has now reached the statutory maximum so that in future vacancies will only arise through death or resignation.

6. Honorary Fellows.

(1) During the year one distinguished scholar was elected an Honorary Fellow:—

Dr. Sir Jivanji Jamshedji Modi.

(2) One Honorary Fellow was lost by death:—

Sir Charles Eliot (1920).

(3) At the end of 1931 the number was 29; statutory maximum 30.

7. Obituary.

(1) During the year the Society received to its great regret news of the death of the following distinguished relations:—

Lt.-Col. Auguste Bonifacy, Corresponding Member of the French Further Eastern School, Hanoi.

Pandit Lakshman Shastri Dravida, an Editor in the *Bibliotheca Indica* Series.

8. Condolences.

(1) The Council expressed condolences to the relatives of the following distinguished personality deceased during the year:—

Mrs. D. Sewell.

9. Council.

(1) The Council met 11 times during the year. The attendance averaged 9 of the 19 component members.

(2) The following resolutions of thanks were passed by the Council:—

To Dr. Hidayat Hossain at the occasion of the completion of his edition of the Persian text of the *Ma'āṣir-i-Raḥīmī* in the *Bibliotheca Indica*.

To Dr. Brahmachari for his offer to present to the Society a series of framed photographs of the Society's past Presidents; and for his offer to continue to defray the expenses of light refreshments to the Members of the Society before the Monthly General Meetings.

To Sir Jadunath Sarkar for his suggestions regarding the publication of certain works in the *Bibliotheca Indica*.

To Mr. K. C. Mahindra, Honorary Treasurer, for his painstaking investigation concerning the financial position of the Society with regard to the *International Catalogue of Scientific Literature.*

To the Members of the Committee charged with the making of arrangements for the representation of the Society at the centenary celebration of the British Association for the Advancement of Science in London.

To Mr. C. C. Biswas and the Hon. Mr. B. B. Ghose for assistance and advice in connection with questions of Municipal re-assessment of the Society's building.

To Mr. James Insch for his presentations to the Society of a MS. copy of the Arabic version of Euclid; and a copy of the Oxford *New English Dictionary*, twelve volumes.

To Lt.-Col. Knowles for his presentation of a copy of his Memoir on *World Malaria* in the *Indian Medical Research Memoirs*.

To the outgoing members for the services rendered by them to the Society.

10. Office Bearers.

(1) The changes in the Council during the year were as follows:—

Col. Sewell left India on the 19th September and Dr. Brahmachari acted as President for the remainder of the year.

Mr. Mahindra was absent from 26th May, 1931, to 5th June, 1931, and the General Secretary officiated for him during his absence.

MM. H. P. Shāstri, died on 17th November, 1931.

Mr. Mahindra resigned on 28th November on account of absence from India and Mr. James Insch was appointed Treasurer in his place.

The Hon. Mr. B. B. Ghose resigned on 26th November, 1931.

(2) Absences other than those mentioned above were:—

Col. Sewell, from 17th February to 8th March.

Dr. Guha, three months, January to March.

Dr. Hora, from April for the remainder of the year.

Dr. Fermor, four months, from the middle of April to the middle of August.

Prof. Mahfuz-ul Haq, from the 28th April to the 1st July, and again from the 14th October to the 20th November.

Col. Knowles, from the 7th May to the 6th November.

Mr. K. C. De, from the 20th April to the 18th December.

Sir C. C. Ghose, from the 18th May to the 1st June.

Sir R. N. Mookerjee, from the 15th May to the 16th July.

Dr. Jenkins, from July for the remainder of the year.

Sir J. C. Coyajee, from the 6th August to the 15th October.

The Hon. Mr. B. B. Ghose, from the 20th September to the 1st November.

Mr. Van Manen, from the 27th October to 4th November.

11. Committees of Council.

(1) The standing Committees of Council during the year, namely, the Finance, Publication, and Library Committees, met monthly, except in October and the recess months.

(2) Special Committees were appointed to examine the Government's retrenchment proposals as affecting the Society and as affecting the Scientific and Educational Departments generally, and to submit memorials thereanent to the Government. Further, a Committee was appointed to reply on

behalf of the Society to the Government in connection with a proposed modification in the Ancient Monuments Preservation Act of 1904.

These various Committees drafted certain memorials which, after approval by the Council, were forwarded to the Government on behalf of the Society.

12. Finance Committee.

(1) The Finance Committee continued during the year to meet separately on dates different from, and a few days previous to, those of the Council Meetings.

(2) A special meeting to frame the budget for next year was deferred to January, 1932.

13. Office.

(1) *General Secretary.*—The General Secretary continued to perform the amalgamated duties of General Secretary and Assistant Secretary and, apart from absence on leave from the 27th October to the 4th November, attended office almost all days of the year, holidays and Sundays included.

(2) *Staff.*—Changes in the office staff occurred as follows:—

The services of N. K. Biswas, Library Assistant, and of H. B. Banerjee, File Clerk, were dispensed with from the 1st May. Mr. H. A. Brown was appointed from the 1st June as a Stenographer. Albert Michael was engaged from the 2nd March to work on the old files, archives and stock.

Attendance and spirit were generally satisfactory but in its totality our staff is not yet what it ought to be either in quality or in quantity. We have once more to repeat that our work is too highly specialised to be merely mechanical. The Society's resources do not only not permit of an increase of salaries or extension of personnel on any large scale, but its present financial conditions may soon make it imperative to consider the question of reduction of staff. This is unhappily not a question of lack of work but lack of money. If the present financial depression continues this will constitute a great problem.

The old problem of holidays remains a delicate one. There is still a tendency to press for an extension of holidays allowed under the staff regulations which in our Society cannot be as lavishly granted as in Government offices.

(3) *Subordinate Staff.*—In the subordinate staff the usual minor changes took place, which do not call for comment, but which continued to demonstrate the characteristic lack of stability in menial employment.

(4) *Correspondence.*—The difficulties of this part of the work of the office were no less during the year than during the previous years, and it is very evident that the resources of the office in this respect need substantial strengthening. Not only a capable letter-drafter for routine letters is required, but in addition an Officer capable to deal with the more scholarly portion of our correspondence, which remains appreciable. Requests for information on the greatest variety of topics, or appeals for scholarly assistance in one way or another, remain numerous, and a proper dealing with such letters requires more time than at present can be given to them. Besides, the matter is a kind of vicious circle. The more politely and fully a scholarly request is replied to, the more numerously similar requests flow in. One of the functions, and quite legitimate functions, of the Society might be to be a kind of clearing-house for scholarly information and contact. But this it can only be if such activity is made an essential branch of its work instead of remaining a kind of by-product. At present routine correspondence and scholarly correspondence crowd out each other and the more is performed for one section the less can be done for the other, with the resultant discontent in one of the two camps, that of the business relations and that of the scholarly relations of the Society. This year again the attainments in letter writing were far below the ideal measure and quality. The number of outgoing letters was 2,572, a low total as compared with the last 8 years, and about 150 below the previous year's total of 2,704. The number of incoming letters was 2,916 as against 3,309 the year before.

One great improvement in this department was made by the appointment of a capable stenographer in the person of Mr. H. A. Brown, which enabled the General Secretary to reduce to some extent the time devoted by him to his letter writing. Unfortunately this additional appointment on the staff coincided with the deplorable financial situation in which the Society, together with the rest of the world, finds itself at the end of the year, and it is only to be hoped that no financial considerations may prevent the continuation of so essential an appointment in our office.

(5) *Council Circulars.*—The number of Council and Committee circulars issued during 1931 was 126.

During the last three years a very important piece of work has been undertaken with regard to our Council files which now has progressed so far as to show valuable results. This work consisted in the collection of all the Council and Committee circulars issued during the years 1927 to 1930 inclusive. After collection, all relative documents regarding each circular have been typed out and added to it, and the various circulars with the original notes of the Council and

Committee Members together with their relative documents have been bound in annual volumes of which four are now complete. The volumes have been carefully indexed and have been furnished with a chronological list of contents and practically exhibit and embody in detail the history of the activities of the Society for each respective year. It is hoped that it will be found possible to carry these volumes back to the year 1924, inclusive, with complete contents for each year. Whether it will be possible to carry the work further back will depend on the examination of our older files which is still proceeding. For the future history of the Society these volumes will be of the utmost importance and it is only to be regretted that the documents illustrating the inner life and mechanism of the Society relating to previous years have not been prepared and put together in a similar manner.

(6) *Files.*—During the year no progress was made with regard to the files, old and new. For the ninth time in succession the Annual Report has to record the leaving of a file-clerk who was intended to create order in the chaos. The right man has not yet turned up to conquer, and not to be defeated by our old papers. Nevertheless, with the spasmodic and intermittent work put in during the last nine years, the situation is on the whole vastly better than it was before this period, though very much wearisome labour has still to be performed. One of the reasons why work on our old files and documents is so difficult is their crowded condition. Sorting out requires space and we have neither a file room, nor proper file cabinets to arrange our documents systematically and definitely. What a previous file-clerk has sometimes quite satisfactorily sorted out and arranged has often been re-arranged, or rather disarranged again, by a subsequent man. We have anyhow arrived at the position where current matter has become fairly accessible, though by more or less rule-of-thumb methods.

(7) *Stock-room.*—The labeling, bundling, and registration of the contents of the stock-room were kept up-to-date during the year for new publications. The stock books for new accessions and the sale registers were also carefully kept.

The important activity taken up last year, namely, the sorting out, bundling and stock registering of the copies of the old series of our *Journal*, which came to an end in 1904, was completed. At present we are in a position to know whether copies of any complete volume, complete part, or stray number of the old series is still available and where to find it. In the past such information was merely a question of guess-work.

Similar work has still to be performed for our *Proceedings*, 40 volumes. During the year several miscellaneous publications have, however, been dealt with in the above manner.

Final order in the stock-room except for some residuals is in sight.

(8) *Distribution.*—No change was made in the mode of distribution of our publications and notices. An appreciable amount of issues of the *Bibliotheca Indica* was again distributed during the year.

(9) *Addresses.*—The printed address labels remained in use and the system of constant revision and addition which has been adopted enables us to keep the printed addresses up-to-date month by month.

(10) *Card Register.*—The card registers of the Society's membership and of the Indian Science Congress were kept up-to-date and checked at the close of the year.

(11) *Stationery.*—As the administration regarding this item is now satisfactorily arranged, the subject does not call for special remarks.

(12) *Circulars and Forms.*—The number of these printed during the year was 61 being one more than the year before, and practically the same as in previous years, showing that such printing is methodical and not haphazard. During the year about Rs. 850 were expended under this head which makes us think that it might be advisable to consider whether the introduction of a modern contrivance for the production of such notices in the office might not be advisable. On the whole, however, we are inclined to think that the neatness gained and the time saved by printing such notices and circulars is well worth the sum that might perhaps be saved.

(13) *Office Furniture.*—An additional desk was added to the staff room and five dozen collapsible chairs were bought for use in the meetings. Renewal of several old tables and desks is on the programme for future years, as well as a general renovation of our electric fans which are beginning to be decidedly ancient and to cost more and more annually for petty repairs. Renewal of the fans will be a costly item which at present we cannot contemplate. Renewal and completion of furniture and fittings is an administrative detail that should be regularly seen to if slovenliness and discomfort are to be avoided.

(14) *Office Manual.*—This still remains a desideratum.

(15) *Arrangement.*—No change was made in the present disposition of the rooms and their contents.

(16) *General.*—Once more we draw the attention of all our members to the fact that there is still room for expansion in all kinds of directions with regard to our office, both as to men and material. As to men, the correspondence, library, and book sale departments could fully occupy the services of further men, and the building could occupy a caretaker to supervise its daily upkeep. As to materials we should like

to make our servants look smarter by a greater clothing allowance, should like to make better arrangements for lantern lectures, and a greater variety of projecting apparatuses. A loud-speaker would be invaluable in our meetings, and an addressograph would be welcome for the despatch section. Proper file cabinets and, indeed, a whole file installation are a crying need. Racks are necessary for miscellaneous possessions, such as photographs, maps, estampages of inscriptions, and the like. Indeed equipment of all kinds is in need of expansion and improvement, not to mention mere upkeep. This theme has been dealt with under its various aspects in all our recent Annual Reports. The matter should be constantly kept before the members. The Asiatic Society of Bengal which studies the works of nature and the productions of men has surely also to study the perfect running of a model office.

14. Rules and Regulations.

(1) During the year no changes were made in the Rules of the Society. Some minor changes were introduced in the Regulations regarding the election of Fellows, and the Council framed Regulations for the award of the Paul Johannes Brühl Memorial Medal.

15. Indian Science Congress.

(1) The Eighteenth Annual Meeting of the Indian Science Congress was held in Nagpur, from January 2nd to January 7th, 1931, under the patronage of His Excellency Sir Montagu Sherard Dawes Butler, M.A. (Cantab.), K.C.S.I., C.B., C.I.E., C.V.O., C.B.E., I.C.S., Governor of the Central Provinces.

(2) Lt.-Col. R. B. S. Sewell, President of the Asiatic Society of Bengal, was President of the Congress.

(3) The *Proceedings* of the Congress were published in November. The publication contained 586 pages, 6 more than the year before. The number of abstracts sent in for reading to the Congress has decreased this year to 699 as against 754 last year.

(4) During the latter months of the year the usual administrative work for the Congress in connection with the next Session (Nineteenth Congress) to be held in Bangalore was performed by the Society's office, which also attended to the general administration of the Congress when not in session.

(5) As in previous years the programme of the meeting and the abstracts were sent, as far as was practicable, by post to all members who had applied for membership before the date of publication. This year this date was again late, the 14th December, leaving not much more than a

barely sufficient margin of time to reach distant members before their departure for Bangalore. There was this year still an appreciable amount of very late enrolment.

(6) The Congress finances remained separate from those of the Society.

(7) The General Secretaries to the Congress were Prof. S. P. Agharkar and Prof. H. B. Dunnicliff, as in the previous year.

(8) The Asiatic Society of Bengal issued a reprint of the *Proceedings* of the 5th Congress, Lahore, and the Council also decided to reprint the *Proceedings* of the 3rd Congress, Lucknow. When this latter reprint is published the first five *Proceedings* will be completely available in a remodelled and satisfactory form and a sufficient number of complete sets of the *Proceedings* will thereby be procurable for Scientific Libraries. For the moment the reprinting of old issues of the *Proceedings* will be brought to a stop. The 6th, 7th, and 8th *Proceedings* will in due time perhaps also need reprinting but the present time is not favourable towards the undertaking of such a task. For the moment a small number of copies of the old edition of these three *Proceedings* is still in stock and for some time to come the needs of scholars can be met. The 6th, 7th, and 8th *Proceedings* are fairly bulky and their reprint would mean a considerable outlay of which at present no thought can be entertained.

(9) The 18th Congress adopted a constitution and revised its rules, converting the Indian Science Congress from an annually resurgent body into a permanent, surviving Association. The effect of these rules with regard to the Asiatic Society of Bengal will be that much earlier administrative action with regard to the Congress can be taken by the Society's office, and this may go far towards preventing the great pressure of work thrown on the office towards the end of the year, which for several years has proved a heavy burden.

16. Indian Museum.

(1) The Society's representative on the Board of Trustees of the Indian Museum, under the Indian Museum Act X of 1910, continued to be Rai Upendra Nath Brahmachari Bahadur.

17. Kamala Lectureship.

(1) The Council's nominee to serve on the Election Committee of the Kamala Lectureship, administered by the Calcutta University, remained the same, MM. Hārāprāsad Shāstri, who died towards the end of the year. His successor will be appointed in 1932.

18. Deputations.

(1) The Society received invitations to send representatives to various functions of the undermentioned bodies:—

(1) All-India Hindi Literary Conference, Calcutta, May, 1931.
(2) Centenary Meeting of the British Association for the Advancement of Science, London, September, 1931.

A Sub-Committee of members present in England arranged for adequate representation of the Society at the meeting of the British Association.

A letter of greetings was addressed to the All-India Hindi Literary Conference.

19. Honours.

(1) Amongst the Honours conferred during the year several were, as usual, bestowed on members of the Society. No less than five received the honour of Knighthood, namely: Mr. W. L. Travers, Dr. A. A. Suhrawardy, Mr. N. N. Sarkar, Mr. Chhajuram Chowdhury, and Col. S. R. Christophers. Major Nawab Muhammad Akbar Khan, Khan of Hoti, received the K.B.E. Mr. C. C. Biswas, Mr. James Peddie and Lt.-Col. H. W. Acton received the C.I.E. Hakim Mohammad Syed Sadiq was made a Shifa-ul-Mulk. Mr. Ajit Nath Das was made a Rai Bahadur.

20. Congratulations.

(1) The Society sent its cordial congratulations to two of its Life Members, Dr. S. W. Kemp (also a Fellow of the Society) on obtaining his Fellowship of the Royal Society, and to Dr. Binayatosh Bhattacharyya on receiving the title of Rajaratna from His Highness the Gaekwad of Baroda.

Congratulations were also sent to several of the above recipients of Civil Honours.

21. Visits.

(1) During the year the Society was again visited by a number of distinguished personalities from all parts of the world. Asia contributed visitors from India, Ceylon, China, and Persia. Europe contributed visitors from Germany, France, Rumania, and Italy. The United States of America and New Zealand were also represented. The visitors, as usual, represented the most different branches of scholarship.

22. H.E. the Viceroy.

(1) H.E. the Earl of Willingdon, Viceroy and Governor-General of India, graciously accepted the invitation extended

to him to accept the Office of Patron of the Society, thereby maintaining the old tradition inaugurated at the time of Warren Hastings.

23. Social Functions.

(1) No social functions were held by the Society during the year, but the Society, enabled to do so by a generous donation from Dr. U. N. Brahmachari, has maintained the ancient practice of providing light refreshments to the Members present before the General Meetings.

24. Elliott Prize for Scientific Research.

(1) The (annual) prize offered for the year was for research in Geology and Biology (including Pathology and Physiology). Papers were submitted in competition for the prize by two candidates. The award will be made in the Annual Meeting of 1932.

(2) The prize for next year (1932) will be for research in Mathematics.

25. Barclay Memorial Medal.

(1) The (biennial) award of the Barclay Memorial Medal for conspicuous contributions to Medical and Biological Science with reference to India, for 1931, will be announced in the Annual Meeting of 1932.

(2) The next award will be announced in 1934.

26. Sir William Jones Memorial Medal.

(1) The (biennial) award of the Sir William Jones Memorial Medal for conspicuous Asiatic Researches in Science was announced in the Annual Meeting of 1931. The medal was bestowed on Dr. Felix H. D'Herelle.

Lt.-Col. R. B. S. Sewell received the medal on behalf of Dr. D'Herelle.

(2) The next award will be announced in the Annual Meeting in February, 1933.

27. Annandale Memorial Medal.

(1) The (triennial) award of the Annandale Memorial Medal for important contributions to the study of Anthropology in Asia was announced in the Annual Meeting in February, 1931. The medal was bestowed on Dr. Charles Gabriel Seligman.

Lt.-Col. R. B. S. Sewell received the medal on behalf of Dr. Seligman.

(2) The next award will be announced in the Annual Meeting in February, 1934.

28. Joy Gobind Law Memorial Medal.

(1) The next (triennial) award of the medal for conspicuously important work on Zoology in Asia will be announced in the Annual Meeting in February, 1933.

29. Paul Johannes Brühl Memorial Medal.

(1) If arrangements can be completed the first (triennial) award of the Brühl Memorial Medal for important contributions to the study of Asiatic Botany will be announced in the Annual Meeting in February, 1932.

(2) Regulations for the award were framed by the Council during the course of the year. By the end of the year, however, certain matters with regard to the administration of the award were still under discussion by the Council.

30. Calcutta Indian Science Congress Prize.

(1) The first award is to be made in connection with the next Session of the Congress to be held in Calcutta, and regulations are to be framed by the Council of the Society prior to the date of that Session.

31. Society's Premises and Property.

(1) A sum of Rs. 2,000 was again set aside during the year to be credited to a Building Repairs Fund.

(2) The various desiderata and problems existing under the heading Premises and Property have been mentioned in the Annual Reports of the last few years and have to be kept in mind until realisation.

(3) Since the rebuilding of the Society's House in 1923 no 'triennial' repairs have been undertaken and in recent years attention has been drawn in the Annual Reports that such periodical repairs were long overdue. An examination of the building in the latter part of the year proved that earth tremors in recent years have again severely shaken parts of our very old building and that it was necessary to replace a dozen rafters by steel girders. Urgency therefore made us take in hand the work in December and thorough repair, cleaning, and repainting were effected. As our budget had only made available Rs. 4,000 to meet the necessary expenditure and as the costs, including those of re-laying a large part of the malthoid covering on the roof, required an amount far in excess of the available sum, the Council decided that the only way to meet the liability was by an appropriation from the already small Building Fund which, as a result, will be reduced during the coming year to a balance of only some Rs. 4,000,

a very paltry sum. But, at all events, our building is again decent and for the moment in good repair. We cannot shut our eyes to the fact that, nevertheless, in another five years or so similar repairs will have to be undertaken as, for one thing, the substitution of steel girders for wooden rafters throughout the building has only progressed half-way. We feel fortunate that the repairs have again been executed by the firm of Martin & Co. who have had our house under their care for many decades and known its condition thoroughly. The work was still in progress at the end of the year and was estimated to require at least six weeks for its completion, working at high speed.

32. Accommodation.

(1) The old problems still needing attention are: the provision of a set of small work-rooms for various uses, foremost of all for the archives and the editorial work of the Society, extension of the steel shelving in the Library and better shelving in the stock-rooms. But a menacing cloud on the horizon is, above all, the fact that our library rooms are gradually being filled and that the need for extension of the space available for the stacking of books becomes very imminent. We do not yet see where to gain the additional accommodation.

33. Artistic and Historical Possessions.

(1) Two very valuable gifts were received during the year. Sir B. L. Mitter, Law Member, Viceroy's Council, a valued Member and former Council Member of the Society, presented to the Society the Full Power granted to him by His Majesty the King Emperor, and sealed with His Majesty's Great Seal, constituting Sir Brojendra Lal Mitter, His Majesty's Commissioner, Procurator and Plenipotentiary in respect of the Empire of India at the 12th Assembly of the League of Nations at Geneva. In this document Sir B. L. Mitter was invested with full power and authority to treat, adjust, and conclude any Treaties, Conventions, or Agreements on His Majesty's behalf. This remarkable document will be suitably framed and hung in the Society's Rooms.

(2) Dr. U. N. Brahmachari, Acting President, presented the Society with 12 frames each containing 6 portraits of the past Presidents of the Asiatic Society of Bengal. With infinite patience and great perseverance he succeeded in collecting authentic photographs of all but two of our old Presidents. To the Society this present is of the greatest value and the frames have been suitably hung partly on the wall facing

the head of our staircase and partly in the Council Chamber. The collection will be unveiled in the present Annual Meeting.

(3) No paintings were cleaned or renovated during the year. The set of photographs of our paintings is still to be completed and that of our statuary to be begun. All our marble busts, however, have been carefully cleaned during the year.

34. Presentations, Donations and Legacies.

(1) Except for the presentations mentioned under the previous heading and those to be mentioned under the next one, no presentations were received during the year. A donation of Rs. 100 was received from three members for the special purpose of purchasing a costly Russian Dictionary. Other donations, or legacies, were, unhappily, not forthcoming.

35. Library.

(1) *Permanent Library Endowment Fund.*—The fund received no further donations during the year. The total invested capital (face value) increased to Rs. 12,000. The accumulated interest permitted the purchase of one further paper of Rs. 1,000 (face value, 3½ per cent.) during the current year.

As the total investments in 3½ per cent. paper have to be raised to a face value of Rs. 30,000 before income from the fund can be utilised in aid of Library expenditure, it is necessary that an amount be received sufficient to purchase further paper to a face value of Rs. 18,000 before this desirable goal is reached. May this further sum come soon!

(2) *Accessions.*—The accessions to the Library during the year, exclusive of about 200 periodicals received through exchange or otherwise, numbered 363 volumes, out of which 214 were purchased and 149 were acquired by presentation. The complete series of the important quarterly *Science Progress*, Vols. 1–25, was acquired at a nominal price and has been added to our collection of periodicals.

The grant for the purchase of books for the year was Rs. 2,800 but actually an amount of Rs. 3,186 was spent. For the new year the grant has been decreased by Rs. 300 and fixed at Rs. 2,500.

The more important items of presentations are given below. They include a copy of the most valuable and useful great Oxford New English Dictionary, 12 volumes, and a MS. copy of the Arabic version of Euclid, generously presented by Mr. James Insch.

Presentations of Interest.—

(1) A Speech Delivered by Ghazi Mustapha Kamal. Leipzig, 1929. (Turkish Ambassador in Kabul.)
(2) Jacques Guenne: Prague the Town of Art. Paris, *n.d.* (Consul for Czechoslovak Republic in Calcutta.)
(3) A Bibliography of Indian Archæology, 1929. Leyden, 1931. (Kern Institute, Leyden.)
(4) Frank Schlesinger: Catalogue of Bright Stars. New Haven, 1930. (Yale University Observatory.)
(5) K. P. Jayaswal: Manu and Yajnavalkya. Calcutta, 1930. (Calcutta University.)
(6) Casey A. Wood: Introduction to the Literature of Vertebrate Zoology. Oxford, 1930. (McGill University, Montreal.)
(7) Inscriptions (Texts) and Chronological List of Inscriptions of the Pudukkottai State. 2 Vols. Pudukkottai, 1929. (Pudukkottai State.)
(8) Golap Chandra Barua: Ahom-Buranji. Calcutta, 1930. (Assam Administration.)
(9) J. Kunst: A Study of Papuan Music. Weltevreden, 1931. (Netherlands East Indies' Committee for Scientific Research.)
(10) C. E. A. W. Oldham: Journal of Francis Buchanan, Bhagalpur. Patna, 1930. (Government of Bihar and Orissa.)
(11) Centenaire de Marcelin Berthelot, 1827–1927. Paris, 1929. (The Memorial Committee.)
(12) Reconstruction Album. Tokyo Imperial University Library, 1923–1929. (Tokyo Imperial University.)
(13) Harada, Yoshito: Lo-Lang. Tokyo, 1930. (Tokyo Imperial University.)
(14) Krom, N. J., en Erp, T. van: Beschrijving van Barabudur Text (Vol. 2) and Plates (Vol. 3). The Hague, 1931. (The Dutch Government.)
(15) Finsterbusch, C. A.: Cock fighting all over the world. Gaffney, 1929. (The author.)
(16) Sacred Books of the Jains, 4 Vols., Lucknow, 1927–30. (Central Jaina Publishing House, Lucknow.)
(17) One set of the Tripitaka, the Buddhist Scriptures (in Pali). (Government of Siam.)
(18) One set of the Paramatha-Manjusa Visuddhi Maggatika, the Commentary on Visuddhi Magga (in Pali). (Government of Siam.)

Of special interest are the new accessions which represent works produced by Members of the Society. These were partly acquired by presentation and partly by purchase. The following may be mentioned:—

Accessions of works written by Members.—

(1) George N. Roerich: Trails to Inmost Asia. New Haven, 1931.
(2) Hem Chandra Ray: Dynastic History of Northern India. Vol 1. Calcutta, 1931.
(3) G. Tucci: Doctrines of Maitreyanatha and Asanga. Calcutta, 1930.
(4) Sir Aurel Stein: An Archæological Tour in Gedrosia. (Mem. A.S.I., 43). Calcutta, 1931.
(5) Girindra Nath Mukhopadhyaya: Lathyrism; or Khesari Dal Poisoning. Calcutta, 1929.
(6) Sarat Chandra Roy: Oraon Religion and Customs. Ranchi, 1928.

(7) Sir E. Denison Ross : The Persians. Oxford, 1931.
(8) Suniti Kumar Chatterji : A Bengali Phonetic Reader. London, 1928.
(9) Bimala Churn Law : Buddhistic Studies. Calcutta and Simla, 1931.
(10) W. Caland : Pañcaviṃśa-Brāhmaṇa, English Translation. Calcutta, 1931. (Bib. Ind. No. 255.)
(11) S. C. De : Stray Thoughts. Calcutta, *n.d.*
(12) N. P. Chakravarti : L'Udanavarga. Sanskrit. Vol. 1. Paris, 1930.

(3) *Accessions Lists.*—Quarterly lists of additions to the Library have been prepared but are still in the press.

(4) *Preservation.*—The use of *nim* leaves and the practice of dusting the volumes with an insecticide powder were continued.

(5) *Binding.*—During the year 926 units, including books, pamphlets, and periodicals, were bound at the cost of Rs. 1,152, out of total budget allowance of Rs. 1,200 sanctioned for the purpose.

The vigorous binding policy for the last eight years has now almost attained its object, and arrears in binding have now practically been wiped out. In all about 11,600 units have been bound during the last eight years. It has consequently been possible again to reduce the binding grant for the next year by another Rs. 400, and it has been fixed at Rs. 800.

(6) *Arrangement.*—The segregation of the pamphlets (technically prints of less than 64 pages, issued unbound) in our collection was vigorously continued. At the end of the year this separate collection had grown to about 3,000 items. Probably another 500 have still to be picked out from the general collection to make this section complete; and the work should be practically finished this year.

(7) *Catalogue.*—Work on the new Author Catalogue of books in European Languages was continued steadily and as rapidly as the available means permitted. Copy for the letter Q inclusive, was prepared and sent to press for composition. Page proofs have advanced to page 272.

(8) *Shelving.*—Installation of special steel shelving for MSS. and books in the western section remains to be effected, and provision has also to be made for further steel shelving, especially for the current accessions of periodical literature.

The Librarian reports that our available shelving space for printed books is rapidly coming to an end. This will in the near future constitute a serious problem.

(9) *Finance.*—We repeat what was said last year under this head :—

'Attention should once more be drawn to the fact that a sum of Rs. 4,000 annually, which constitutes the utmost limit which the Society at present can devote to purchase and binding of books, is entirely inadequate to build up or to maintain a first-class library. Administration and upkeep of our present collection demand at least an equal amount annually, and the total expenditure is a heavy burden on the Society's yearly budget. It is impossible to stress sufficiently the necessity for the speedy creation of a considerable endowment fund for our library. We have made a beginning, but that beginning is small. We need the generous help of all friends interested in our work and in learning in India, to make the little twig recently planted grow rapidly into a sheltering banian.'

To this we have to add that for the next year the amount of Rs. 4,000 budgeted last year for the Library has of dire necessity been cut down to Rs. 3,300, an entirely inadequate amount.

36. Finance.

(1) Appendix III contains the usual statements showing our Accounts for 1931. No change has been made in the form of their presentation, except that the Investment Account has been modified slightly as advised by our Auditors and as explained below.

(2) One new Statement is given:—

Statement No. 26, Government Treasury Bill Account.

(3) One old Statement does no longer appear. It refers to the Catalogue of Scientific Serial Publications, Calcutta, Statement No. 17. This Account has been closed during the year and the balance standing to its credit has been transferred to the Publication Fund Account, Statement No. 23, by a resolution of the Council on the recommendation of the Finance Committee.

(4) One Statement still carried over without change from the previous year, pending final ascertainment of commitments and status before liquidation, is:—

Statement No. 18, International Catalogue of Scientific Literature, London.

During the year its status has been thoroughly investigated and liquidation will be attempted in the near future.

(5) The other statements are presented as in the previous year and do not call for special comment.

(6) The fund accounts again give their invested assets written down to the market values as at the end of the year, and the Investment Account, Statement No. 27, shows the allocations of invested paper to each fund specifically, whilst both market and face values of the investments are shown in it. As advised by our Auditors in their report for the year 1930, a slight modification has been made in the presentation of this Account. The statement of accumulated depreciation of investments since purchase has been replaced by

a statement of annual depreciation or appreciation and all previously accumulated depreciation (in several cases going back to the last century) has been definitely written off.

(7) Statement No. 29 shows the Balance Sheet of the Society and the different funds administered by and through it.

The funds belonging to, or administered by, the Society may be classified as follows:—

(*a*) General Fund.
  (i) Permanent Reserve.
  (ii) Working Balance.

(*b*) Specific Funds belonging to the Society.
(*c*) Funds administered by the Society.

At the end of the year, the position of these funds, as compared with their position at the end of 1930, was as follows:—

	Face value. 31st Dec., 1930.	Market value. 31st Dec., 1930.	Face value. 31st Dec., 1931.	Market value. 31st Dec., 1931.
	Rs.	Rs.	Rs.	Rs.
1. General Fund	2,75,000	1,89,360	2,96,900	1,68,600
(*a*) Permanent Reserve	2,25,600	1,43,070	2,46,500	1,29,040
(*b*) Working Balance ..	49,900	46,290	50,400	39,560
2. Specific Funds belonging to the Society	52,480	43,900	49,200	36,700
3. Funds administered by the Society	29,200	23,040	30,300	23,500
TOTAL ..	3,57,180	2,56,300	3,76,400	2,28,800

(8) The amount standing to the credit of the Permanent Reserve Fund at the end of the year is Rs. 2,46,500 Face Value, invested in 3½ per cent. Government Paper.

During the year Rs. 544 were received through admission fees and one member compounded his subscriptions at Rs. 300. Three Institutional Members were admitted whose registration fees amounted to Rs. 150. These total Rs. 994, which together with a sum of Rs. 10,000 as budgeted and a sum of Rs. 1-2, cash balance, brought forward from 1930 under this head, in all—aggregating Rs. 10,995-2, were transferred to the Permanent Reserve. This was affected by the usual conversion, at the market rates, of investments belonging to the Temporary Reserve of the working balance (Government Paper 3½ per cent. of the Face Value of Rs. 20,900).

A cash balance of Rs. 35-11 is being carried over to the ensuing year, for adjustment under this head.

(9) The Society received the following grants from the Government of Bengal as follows:—

For	Rs.	Statement.
Journals	2,000	1
O.P. Fund No. 1	9,000	2
O.P. Fund No. 2	3,000	3
Sanskrit MSS. Fund	3,600	4
Do.		
TOTAL ...	20,800	

The receipt during the year of the Government of India Annual Grant of Rs. 5,000 for the Arabic and Persian Manuscripts and Cataloguing Fund has been mentioned in Statement No. 5.

(10) The income derived from advertising during the year amounted to Rs. 9,600.

(11) The temporary investments of funds in Fixed Deposit, Savings Bank and Government Treasury Bill are shown in Statements Nos. 24, 25 and 26. Amounts set aside for earmarked expenditure are shown in Statement No. 12, as also in Statement No. 16.

(12) Statement No. 22 gives an account of the amounts due to and by the Society for members' subscriptions, sales of publications and contingent charges.

(13) The Government Securities shown in Statement No. 27, are held in safe custody by the Imperial Bank, Park Street Branch. There was again a further and heavy depreciation of the Government Securities held at the end of the year, amounting to Rs. 35,130, affecting to that extent the assets of the Society.

(14) The Budget estimates for 1931 and the actuals for the year were as follows:—

Estimates.	Receipts. Rs.	Expenditure. Rs.
Ordinary	63,900	63,650
Extraordinary	5,250	5,250
TOTAL ...	69,150	68,900
Actuals.		
Ordinary	62,074	63,215
Extraordinary	994	994
TOTAL ...	63,068	64,209

Of the receipts a sum of Rs. 994, derived from entrance fees, compounding fees and Institutional Membership Registration fees, is classed as extraordinary and is not available for expenditure as it has to be transferred to the Permanent Reserve. The sum of Rs. 3,750 brought forward from last year under the heading extraordinary income for work in connection with the arrears in the publication of the Society's Journal was not expended as the printing bills for Journals during the year were met under the ordinary budget provision. The sum cannot be carried over this year as there are insufficient assets in the publication fund account.

The ordinary income was about Rs. 1,800 less than estimated, practically accounted for by fall in income under the headings members' subscriptions and sales of publications.

On the expenditure side Salaries absorbed about Rs. 1,050, Contingencies, Rs. 400 and Books, Rs. 400 more than estimated. On the other hand savings were effected under various items of expenditure in the budget.

The income from temporary investments of liquid assets not budgeted for amounted to Rs. 2,142 during the year.

The excess of ordinary expenditure over ordinary income amounted to Rs. 1,141.

(15) The year's working shows a shrinkage in the net balance of Rs. 21,448 as compared to that of last year, after providing for depreciation of our investments, amounting to Rs. 31,720, and closes with a net loss of Rs. 10,272.

(16) The Budget estimates for probable expenditure have as usual been framed to meet demands under various heads based on vigorous activity in all departments of the Society's work.

The receipts have been very conservatively estimated.

(17) The next financial year will be a very difficult one for the Society. The reactions on our Society of the world crisis in finance have been alluded to in several places in this present report. The Indian and the Bengal Governments have been forced to drastic retrenchment in every direction, and the Government of Bengal has already notified the Society that its grants-in-aid are to be cut down by 20 per cent., which represents a reduction of income to the Society of Rs. 4,000 whilst a corresponding cut may also be made by the Central Government which would mean another reduction of Rs. 1,000. During the year the Society has lost a net total of 77 members involving a reduction of income of about Rs. 2,500. Book sales have fallen about Rs. 2,000 below the estimates for the year. The budget has therefore to be framed on the basis of a probable fall of income of about Rs. 10,000. The Finance Committee and the Council have given this serious problem the closest consideration. Expenditure has been curtailed. Provision for an increase to the Permanent Endowment Fund has had to be diminished. As a result a balanced budget has been framed and a deficit avoided, with the sole exception of the heading regarding expenditure to be incurred on the publication of our Journals which, during the year, may prove to need a supplementary allocation and which can then only be found from the reserves

of the Society. This is an undesirable position and if during the year the financial conditions do not improve, more drastic curtailment of expenditure, which means the problem of limitation of activity and curtailment of staff, will have to be faced. In the meantime the soundest immediate policy seems to display the greatest energy in our work in the hope that exertion may once more prove stronger than destiny.

BUDGET ESTIMATES FOR 1932.

Ordinary Receipts.

	1931 Estimate.	1931 Actuals.	1932 Estimate.
	Rs.	Rs.	Rs.
Interest on Investments ..	10,500	10,014	12,000
Interest on Fixed Deposit ..	....	2,142	....
Advertising	9,600	9,600	9,600
Annual Grant	2,000	2,000	1,600
Miscellaneous	500	601	500
Members' Subscriptions ..	14,000	13,071	11,000
Publications, Sales, and Subscriptions	8,000	5,246	6,000
Proportionate Share from Funds ..	10,000	10,000	9,000
Donations	....	100	....
Rent	9,300	9,300	9,300
TOTAL ..	63,900	62,074	59,000

Ordinary Expenditure.

	Rs.	Rs.	Rs.
Salaries and Allowances ..	29,500	30,557	30,800
Commission..	500	382	400
Stationery	1,000	720	750
Fan and Light .. .. Telephone	750	652	700
Taxes	2,300	2,244	2,300
Postage	2,000	856	2,000
Freight	....	....	100
Contingencies	850	1,214	850
Petty Repairs	150	154	150
Insurance	500	500	500
Menials' Clothing	200	106	200
Office Furniture	500	488	500
Artistic Possessions	100	....	100
Building Repairs	2,000	2,000	2,000
Provident Fund Share ..	600	655	660
Audit Fee	250	250	250
Books, Library	2,800	3,187	2,500
Binding, Library	1,200	1,152	800
Journals and Memoirs	7,250	7,273	6,940
Printing Circulars	1,200	824	1,500
Permanent Reserve	10,000	10,000	5,000
TOTAL ..	63,650	63,214	59,000

Extraordinary Receipts.

	Rs.	Rs.	Rs.
To Permanent Reserve			
by Admission Fees ..	1,000	544	500
by Compounding Fees ..	500	300	300
by Institutional Membership Registration Fees ..	....	150	50
To Publications	3,750	....	....
TOTAL ..	5,250	994	850

Extraordinary Expenditure.

	Rs.	Rs.	Rs.
To Permanent Reserve			
by Admission Fees ..	1,000	544	500
by Compounding Fees ..	·500	300	300
by Institutional Membership Registration Fees ..	....	150	50
To Publications	3,750	....	....
TOTAL ..	5,250	994	850

37. Publications.

(1) *Journal.*—Of the Journal and Proceedings, Vol. XXVI, for 1930, one number was printed but not yet distributed, containing 27 papers, aggregating 418 pages.

(2) *Memoirs.*—Of the *Memoirs* no number was published during the year.

(3) *Material in Hand.*—A very large amount of material is in hand and in type for both series, to a large extent in an advanced state of preparation.

(4) *Indian Science Congress.*—The *Proceedings* of the 18th Indian Science Congress, consisting of 586 pages, were published, as well as a reprint of the *Proceedings* of the 5th Indian Science Congress (144 pages and 6 plates).

(5) *Special Publications.*—The *Sanskrit MSS. Catalogue*, the *Arabic MSS. Catalogue*, and the *Catalogue of printed books in European Languages in the Society's Library* are described elsewhere in the report.

(6) *Sales.*—The sales of publications were subject to a heavy drop during the year and were more than 50 per cent. below the total of 1929. A sum of Rs. 5,246 was realised under this head, being Rs. 2,754 below the budget estimates. The amount received does not take into account publications sent out (for sale or return) to the Agents and as yet unsold. The great drop in sales is a matter of anxious concern and is no doubt directly related to the financial conditions of the world. As new publications are largely financed from the income from sales of old publications the matter is of vital

importance to the Society. If during the coming year sales remain as low or decrease further, a drastic revision of our publication and sale policy may have to be considered.

(7) *Arrears.*—During the year our arrears in publication with regard to the *Journal* and the *Memoirs* have increased, due to three definite causes. First, there is the perennial excessive amount of administrative work which is at war with the editorial work. Second, there is the matter of available funds. Third, there was a temporary and special reason in that our official number of the *Journal* was held up for the non-supply of copy of certain biographies which should form part of it. During next year it will be our endeavour to make up a substantial portion of our arrears.

(8) *Expenditure.*—Notwithstanding a relatively small amount of matter actually published during the year the expenditure came to no less than Rs. 7,273. During next year a larger amount will in all likelihood be needed. The budget allowance for that year has been provisionally fixed at the same amount as actually spent last year, and during next year the matter will be further considered, when and if it becomes apparent that an additional grant is called for. This matter has been referred to elsewhere, in the paragraph on finance, in this report.

38. The Baptist Mission Press.

(1) Under the capable superintendence of Mr. P. Knight the Baptist Mission Press continued to act as our chief printers and again gave invaluable assistance and maintained closest co-operation.

39. Agencies.

(1) Our European and Indian Agents remained the same throughout the year.

40. Exchange of Publications.

(1) No applications for the exchange of publications were considered during the year, but the problem of the extension of our exchange list becomes more and more urgent, as the years go by, on account of the multiplication of periodical scholarly literature. The Society should have an endowed fund for its exchanges from which postage and the additional cost of printing extra copies of *Journals* and *Memoirs* could be paid. Calculating the actual cost to the Society of a number of its *Journals* sent out in exchange at about Rs. 5 per volume after the initial cost of preparing these publications for the members and subscribers has been paid for, investment of Rs. 100 for each exchange would at the present rate of interest

be sufficient to provide for perpetuity of exchange without any charge on the revenues of the Society. The extension of such a list would then reduce the cost of each volume on account of a lesser proportionate cost per single volume with the increase of the numbers printed. The measure would further strengthen the Library and increase its utility to the members, and is therefore desirable from several points of view. It would further guarantee a minimum income to meet the expenditure on the *Journals* and so would be a kind of insurance against the difficulties of financing these publications in times when membership might be reduced. Printing of late years has become very costly and printing of scholarly matter has become less and less financially profitable. An ideal, not by any means Utopian, would be a Permanent Endowment Fund of about one lakh to provide for anything up to 500 exchanges.

41. Meetings.

(1) The Ordinary Meetings of the Society were held regularly every month, with the exception of the recess months of September and October and of November. The time and day of the meetings remained fixed at 5-30 P.M. on the first Monday of the month. The recorded average attendance was somewhat smaller than that during the previous year, namely, 14 members and 1 visitor. The maximum attendance was in December with 18 members and 6 visitors.

(2) No meeting of the Medical Section was held during the year.

42. Exhibits.

(1) In the Ordinary Monthly Meetings a number of exhibits were shown and commented upon by the exhibitors. The following may be mentioned:—

Hāraprāsad Shāstri: Photographs of two Sati-pillars from Unao in Bundelkhand; and a Manuscript of Kathā-sārit-sāgara composed in Kashmir, about 1070, by Somadeva Bhatta.

43. Communications.

(1) Apart from papers submitted both for reading and subsequent publication, a number of communications, not intended for subsequent publication, were made from time to time in the Ordinary Monthly Meetings.

Amongst such communications made during the year the following may be mentioned:—

Hāraprāsad Shāstri: The Brahman who consecrated the temple of Jagannatha in 1118 A.D. at Puri and his descendants down to the seventeenth century.

M. Mahfuz-ul Haq : A note on the discovery of a fragment of the original illustrated manuscript of Tarikh-i-Alfi; and, A note on two interesting manuscripts of Tuhfa-i-Samī and Dala'il-ul-Khairat.
Ekendra Nath Ghosh : Some remarks on Rele's recent interpretations of the Vedic Gods as figures of biology.
Johan van Manen : Recent work on the study of Proverbs; and, The Tibetan name for Mount Everest.

44. General Lectures.

(1) Five General Lectures were held during the year before fairly numerous audiences of members and invited guests. They were as follows:—

C. A. John Hendry : Two Highways to the North Pole : Spitzbergen and Greenland. March 17th.
J. Percy Moore : Some Aspects of the Behaviour of Land Leeches. March 24th.
R. S. Wauchope : The Evolution of Early Buddhist Cave Temples of India. March 31st.
O. C. Gangoly : Chinese Buddhist Sculpture. April 14th.
Magnus Hirschfeld : An Introductory Outline of Sexology. October 2nd.

45. Philology.

(1) Seventeen papers which were read in the previous year were published.

(2) No papers read during the year were published; these were:—

Sir J. C. Coyajee : The House of Gotarzes : A Chapter of Parthian History in the Shahnamah.
E. N. Ghosh : Studies on Ṛg-Vedic Deities. VII, Deities connected with Lunar Asterisms.
,, ,, VIII, Deities connected with Asterisms.
,, ,, IX, Deities connected with Asterisms (Continued).
,, ,, X, Vasus.
,, ,, XI, Heavenly Dogs.
,, ,, XII, Div, Antariksa and Pṛthivī.
M. M. Chatterji : Shaktaism or woman-symbol of Divinity.
G. N. Roerich : A new work on Tibetan Grammar by Jacques Bacot.
H. Hosten : Description of Indostan and Guzerate by Manuel Godinho de Eredia (1611).
H. Hosten : The Jesuits at Agra in 1635–37.
H. Hosten : Catholicism in the East Indies, in 1680-81, by Fr. A. Thomas.
Chintaharan Chakravarti : A few Indian versions of the story of Solomon's judgment.
S. Chaudhuri : Some Historical Movements of people in Ancient India.
M. Z. Siddiqi : Poets in early Arabia.
S. R. Sarma : A little known Persian version of the Valmiki Rāmāyaṇa.

46. Natural History: Biology.

(1) Five papers read in the previous years were published during the year.

(2) No papers read during the year were published; these were:—

M. C. Cherian: South Indian Acarina.
H. Chaudhuri and G. Singh: The Wither-tip Disease of Citras Plants, Part I.
S. C. Law: Paharia Names of some Birds of Darjeeling.

47. Natural History: Physical Sciences.

(1) One paper read last year was published during the year.

(2) No papers read during the current year were published; these were:—

H. C. Das-Gupta: On the occurrence of a Pathological Triassic Ammonite in the Salt Range, the Punjab.
U. N. Brahmachari: A Therapeutic Salvarsan Derivative allied to Sulpharsenobenzene as prepared in India.
R. B. Seymour Sewell: The Temperature and Salinity of the Deep Water of the Bay of Bengal and Andaman Sea.

48. Anthropology.

(1) Four papers which were read in the previous year were published.

(2) No papers read during the year were published; these were:—

James Hornell: String figures from Gujarat and Kathiawar.
S. C. Mitra: On the worship of the Deity Jalpeshvara in the District of Jalpaiguri in N. Bengal.

49. Medical Section.

(1) No meetings of the Medical Section were held during the year, largely due to the fact that our energetic Medical Secretary, Colonel Knowles, was absent from India during the larger part of the year on urgent sick leave. We were happy that by the end of the year he returned to us much restored in health, unhappily soon afterwards followed by a relapse which now, we hope, has been finally overcome.

50. Bibliotheca Indica.

(1) *Works published.*—Actually published were five issues. Nos. 1511, 1512, 1513, 1514, and 1515, of an aggregate bulk of 35 fascicle units of 96 or 100 pages. The details are given in Appendix II to this report.

Of the above issues three constituted complete works, namely:—

1. Pañca-viṃśa-brāhmaṇa, English Translation.
2. Vivādaratnākara, Sanskrit (Reprint Edition).
3. Tarīkh-i-Mubārak Shāhī, Persian.

(2) *Indian Works continued.*—In the Indian Series work was continued on six books as follows:—

1. Ātmatattvaviveka, Sanskrit.
2. Kāshmīrī Dictionary.
3. Pariśiṣṭaparvan, Sanskrit.
4. Dowazangmo, Tibetan.
5. Vaikhānasa-śrauta-sūtra, Sanskrit.
6. Manusmṛti, with the commentary of Medhātithī, Sanskrit.

(3) *Islamic Works continued.*—In the Islamic Series work was continued on three books, namely:—

1. 'Amal-i-Ṣāliḥ, Persian.
2. Ṭabaqāt-i-Akbarī, Persian.
3. Ṭabaqāt-i-Akbarī, English Translation.

(4) *General Progress.*—The output for the year was one of the largest on record and included the termination of Dr. Hidayat Hossain's edition of the Ma'āṣir-i-Raḥīmī, complete in three volumes of about 3,300 printed pages, begun in 1910. The other great work issued during the year was Professor Caland's translation of the Pañcaviṃśa-Brāhmaṇa, a work of about 700 printed pages. Professor Yazdani's edition of the Persian text of the 'Amal-i-Ṣāliḥ is also well on the way to its completion, in three volumes. Another great work progressing well is Mr. B. De's edition and English translation of the Persian Ṭabaqāt-i-Akbari which will be complete in six volumes, three of the text and three of the translation. The second volume of the text was issued during the year and the second volume of the translation was completed but for the index which is now under preparation. This great work was begun in 1911.

(5) *New Works.*—During the year no new works were sanctioned.

(6) *Prospects.*—For reasons to be detailed in the following paragraph the prospects for the immediate future are none too bright. Several works are in need of speedy continuation and several works in need of re-publication. Several applications were made during the year for acceptance of new works in the series. Some of them are valuable and from the point of view of scholarship it would be most desirable to undertake publication of them as soon as possible. The condition of our finances militates against such action.

(7) *Financial.*—The financial position of our *Bibliotheca Indica* series is bad. We hope this condition is only temporary. The funds from which the publication has to be paid have been overdrawn and stand at a debit. The Government of Bengal has notified the Society that on account of financial stringency the grants hitherto annually made to the Society

for the series will be curtailed by 20 per cent. during the coming year. With its many and heavy commitments and in view of the great age of several of the collaborators in the series this constitutes a grave position. We cannot afford to put off indefinitely the continuation of works in the hands of some of our venerable editors. On the other hand the available funds allow of only little work. The debit incurred by the *Bibliotheca Indica* funds cannot be increased. Half a dozen new works await being taken up and another half a dozen works have been offered without any possibility of such offers being considered for the moment. On top of all this our sales during the year have decreased. Truly a position calling for a certain amount of despondency. But yet we may quote Galileo and say of our series *eppur si move*!

51. Catalogue of Sanskrit Manuscripts.

(1) MM. Hāraprāsad Shāstri's great undertaking again progressed satisfactorily during 1931 until on the 17th November the sudden death of the distinguished scholar fatally intervened. The work as contemplated is the complete cataloguing of all the Sanskrit and allied manuscripts in the collections of the Asiatic Society of Bengal, amounting to a total of approximately 15,000. The work was taken up in 1910 and in 1917 his first volume was published which dealt with the Buddhist manuscripts. The second volume was issued in 1923 and described the Vedic manuscripts. Since then further volumes appeared in rapid succession and during the year under review the sixth volume was issued, dealing with grammar, rhetoric, metre, and lexicography. It contains an elaborate preface of 340 pages and 522 pages text, describing 732 manuscripts. The preface was also issued separately. The seventh volume on Kāvya was in the meantime taken in hand and at the moment of the Shastri's lamented death 448 pages had been printed off, while the remainder of the volume had been corrected in page proof or galley proof by the author. Substantial portions of an elaborate preface had already been written out, and it will be possible to arrange for the issue of the volume, even though the master-hand which gave shape to the work thus far may be missing. The volume ends with MS. No. 5801, leaving the balance of the collection to be dealt with in seven prospective volumes.

The crude material for the further volumes in the form of manuscript notes describing the remainder of our collection is in our possession but needs of course competent checking, verification, and correction before it can be converted into print. During the coming year the Society will have to consider how the undertaking may be continued, both under its scholarly and financial aspects.

The death of the Shastri is undoubtedly the heaviest blow that the Society has sustained for very long.

The staff of the department remained unchanged during the year and during its latter part the work suffered another setback through the absence on account of illness of the senior Pandit, who was the late Shastri's assistant and right-hand man and the custodian of great experience in all the details connected with the preparation of the manuscript material of the catalogue for the Press.

52. Arabic and Persian Manuscripts, Search and Catalogue.

(1) The work in this department was steadily pursued. By suspending all work on the publication of the catalogues of Arabic and Persian MSS. the initial debit balance of the Arabic and Persian MSS. Fund was converted into a small credit balance of about Rs. 1,250 at the end of the year. A much greater balance has, however, to be accumulated before work on the publication of the Arabic catalogue, which is already half in type, can be resumed.

Binding and repairing of previously and newly acquired MSS. was continued and 96 MS. volumes were bound during the year, making, according to a careful recalculation, a total of 1,890 MSS. bound and repaired since the end of 1924, when this activity was taken up systematically. Henceforth the number of MSS. to be bound annually will in all probability be reduced to a few dozens. Practically the binding of the Islamic MS. Library has now been completed.

During the year 99 Persian, Arabic, and Urdu MSS. were acquired by purchase at a total cost of about Rs. 800. Several of the items acquired were of value and great interest. Some unique poetical, historical, and Sufic works are amongst the number. The year proved once more how essential it is to have a limited amount of cash available for immediate expenditure on purchase of stray copies that drift in for sale. There is no doubt that the actual sale value of our purchases in the European market would be several times the amount spent by the Society.

One Arabic MS. was presented by Mr. James Insch and three Persian MSS. were donated by Lt.-Colonel R. N. Chopra.

Mr. Ivanow's Catalogue of the Arabic MSS. in the Society's collections remained in the stage where it was left last year as described in the previous year's report. As soon as the necessary funds are available arrangements will be made to complete the first volume dealing with the theological portion of the collections. The volume will most probably comprise some 700 pages.

One important administrative action was taken during the year. The MSS. described in Mr. Ivanow's first catalogue, 1,781 in number, have been re-arranged on the shelves in the order of their catalogue numbers, a measure which will greatly facilitate their handling. During the coming year it is intended to deal similarly with the MSS. described in the three other volumes of the catalogue. After publication of the Arabic catalogue the Arabic MSS. will be dealt with in a similar manner.

53. Numismatics.

(1) Materials, consisting of seven articles (illustrated by three plates), for Numismatic Supplement No. 43 (for 1930) were received during the year, and are in proof.

54. Summary.

Though the year 1931 was one of sustained activity in all the departments of the Society it was at the same time one strongly and adversely influenced by the financial difficulties prevalent throughout the world. The Society's income was reduced under various headings, the number of new accessions in membership was smaller than for many years, and the number of resignations greater than for a very long time. Nevertheless the total number of ordinary members on the roll by the end of the year, though representing a decrease of 77, still remained over 500, a total only surpassed in the last five years. The number of life members remained the same, 52. The Council and its Committees were active. The staff worked well but needs strengthening and improvement. The hand of death was heavy during the year and made us lose no less than 6 Members of more than a quarter of a century standing. Three new Institutional Members were enrolled. The roll of Ordinary Fellows increased to 46. That of Honorary Fellows remained at 29. Some improvement was made in furniture and fittings, and extensive repairs were executed to the building. The correspondence of the year remained very exacting. The many official and ceremonial obligations of the Society were as much as possible attended to and international intellectual relations were fully maintained. The number of distinguished visitors to the Society's Rooms during the year was great and varied. The various awards of the Society for scholarly merit were administered with care. Rules for a new Brühl Memorial Medal were framed. Some historical and artistic objects were received as presentations. The Library added 363 volumes to its collections and more than 900 volumes were bound. The permanent Library Endowment Fund received no further gifts but its invested corpus was increased to Rs. 12,000. face value, by the purchase of another paper. The financial position of the Society was not fully satisfactory, though investments of about Rs. 20,000, face value, were added to the Permanent Reserve Fund. The year's working produced an actual deficit of about Rs. 10,000. The Government of Bengal made a reduction in its various grants by 20%. Proceeds from book sales decreased by about Rs. 2,000. The chief financial problem before the Society remains the speedy and considerable strengthening of the Permanent Reserve Fund, by several lakhs of rupees. The publication of the *Journal* and *Memoirs* during the year was seriously delayed but much material was prepared for future issue and the supply of new material for publication remained considerable. The monthly meetings continued to be of interest and were well attended. A number of interesting exhibits were shown during the year. Five general lectures were given. The number of Philological papers presented during the year amounted to 16 and three papers on Biology were contributed. Three papers were received on Meteorology and Physical Science. There were two Anthropological papers. In all 24 papers were received. The Medical Section held no meetings. The issues in the *Bibliotheca Indica* were not only numerous, but bulky and important. Amongst them were three complete works, they were of a bulk of 35 units of 96 or 100 pages. No further cataloguing of manuscripts in the Arabic and Persian Section was undertaken during the year, but one further volume of the Sanskrit MS. catalogue was completed. The binding of the collection of Persian and Arabic MSS. was continued and 96 further volumes were bound, making a total of 1,890 volumes bound during the last eight years. 99 new volumes of Arabic and Persian MSS. were added to the Society's Library by purchase and 4 by presentation.

The year under review was one of activity and success notwithstanding adverse financial and economic conditions. All members and officers worked harmoniously together with undiminished enthusiasm and though the financial aspect is not bright the scholarly and social prestige of the Society was fully maintained.

Though the world-depression may still continue and make the work difficult also during the ensuing year, the old experience embodied in the saying that it is never so dark as just before dawn inspires us with the confidence which is needed for that unflagging devotion through which any human activity may be carried on to ultimate success.

[APPENDIX I.]

Membership Statistics.

(As calculated for December 31st, for 30 years.)

YEAR.	ORDINARY.								EXTRA-ORDINARY.				Grand Total Membership.	FELLOWS.	
	PAYING.				NON-PAYING.			Total Ordinary Members.							
	Resident.	Non-Resident.	Foreign.	Total.	Absent.	Life.	Total.		Centenary Honorary.	Associate.	Institutional.	Total.		Honorary.	Ordinary.
1902 ..	126	126	14	266	47	21	67	333	4	13	..	17	350	26	..
1903 ..	127	126	15	268	46	21	67	335	4	13	..	17	352	24	..
1904 ..	132	130	14	276	46	21	67	343	4	13	..	17	360	30	..
1905 ..	144	133	12	288	48	20	68	356	4	13	..	17	373	29	..
1906 ..	173	147	15	335	52	20	72	407	4	12	..	16	423	30	..
1907 ..	174	175	20	369	31	20	51	420	4	12	..	16	436	28	..
1908 ..	181	193	17	391	38	19	57	448	4	13	..	17	465	30	..
1909 ..	183	217	13	413	40	20	60	473	4	14	..	18	491	28	..
1910 ..	209	217	16	442	43	23	66	508	4	14	..	18	526	27	17
1911 ..	200	225	19	444	53	22	75	519	3	14	..	17	536	28	19
1912 ..	203	229	19	451	43	23	66	517	3	13	..	16	533	27	24
1913 ..	200	211	19	430	46	23	69	499	3	14	..	17	516	27	28
1914 ..	191	187	19	397	50	26	76	473	3	14	..	17	490	24	27
1915 ..	171	188	21	380	40	25	65	445	3	15	..	18	463	29	31
1916 ..	145	159	18	322	60	25	85	407	3	15	..	18	425	26	33
1917 ..	150	144	15	309	45	24	69	378	2	12	..	14	392	22	35
1918 ..	153	145	17	315	43	24	67	382	2	10	..	12	394	22	39
1919 ..	141	128	15	284	64	25	89	373	2	11	..	13	386	18	36
1920 ..	161	134	15	310	32	26	58	368	2	11	..	13	381	28	38
1921 ..	160	132	16	308	26	26	51	359	2	12	..	14	373	28	40
1922 ..	160	141	16	317	26	26	52	369	2	13	..	15	384	30	39
1923 ..	147	120	13	280	30	27	57	337	2	11	..	13	350	28	37
1924 ..	209	134	12	355	29	28	57	412	2	12	..	14	426	27	37
1925 ..	263	137	12	412	23	27	50	462	2	12	..	14	476	26	34
1926 ..	319	162	20	501	23	28	51	552	2	12	..	14	566	25	34
1927 ..	328	167	18	513	28	33	61	574	2	13	..	15	589	28	38
1928 ..	344	167	23	534	42	46	88	622	1	12	..	13	635	28	40
1929 ..	331	181	21	533	36	49	85	618	1	10	2	13	631	27	43
1930 ..	291	194	37	522	22	52	74	596	1	8	2	11	607	29	47
1931 ..	228	184	29	441	26	52	78	519	1	8	5	14	533	29	46

[APPENDIX II.]

List of Publications issued by the Asiatic Society of Bengal during 1931.

(a) Bibliotheca Indica (New Series) :

	Price.		
	Rs.	A.	P.
No. 1511 : Vivāda-Ratnākara, Text (reprint) (8 units)	6	0	0
No. 1512 : Tārīkh-i-Mubārak Shāhī, Text with English Notes (3 units)	3	12	0
No. 1513 : Ma'āsir-i-Rahīmī, Text (10 units), Vol. III, Fasc. 2	10	0	0
No. 1514 : Pañcaviṃśa-Brāhmaṇa or The Brāhmaṇa of Twenty-five Chapters, English Translation (8 units)	10	0	0
No. 1515 : The Ṭabaqāt-i-Akbarī, Vol. 2, Complete, Text (6 units)	6	0	0

(b) Journal and Proceedings (New Series) :

	Rs.	A.	P.
Vol. XXVI : No 1 (27 units)	10	2	0

(c) Miscellaneous :

	Rs.	A.	P.
Descriptive Catalogue of the Sanskrit MSS. in the collections of the Asiatic Society of Bengal, Vol. 6, Vyākaraṇa	12	8	0
Survey of the Manuscript Literature on Sanskrit Grammar, Lexicography, Prosody and Rhetoric ...	5	0	0
Proceedings, Eighteenth Indian Science Congress ...	13	14	0
Proceedings, Fifth Indian Science Congress (reprint) ...	5	10	0

[APPENDIX III]

Abstract Statement
of
Receipts and Disbursements
of the
Asiatic Society of Bengal
for
the Year 1931

STATEMENT No. 1.

1931. *Asiatic Society*

Dr.

	Rs.	As.	P.	Rs.	As.	P.
TO ESTABLISHMENT.						
Salaries and Allowances	30,556	12	3			
Commission	381	11	6			
				30,938	7	9
TO GENERAL EXPENDITURE.						
Stationery	719	13	0			
Fan and Light	409	13	9			
Telephone	242	2	6			
Taxes	2,244	7	0			
Postage	856	5	0			
Contingencies	1,214	3	3			
Printing Circulars, etc.	823	14	6			
Audit Fee	250	0	0			
Petty Repairs	153	14	6			
Insurance	500	0	0			
Menials' Clothing	106	0	0			
Furniture	487	14	9			
				8,008	8	3
TO LIBRARY AND COLLECTIONS.						
Books	3,186	9	0			
Binding	1,152	4	0			
				4,338	13	0
TO PUBLICATIONS.						
Journal and Proceedings and Memoirs				7,273	12	3
TO CONTRIBUTIONS.						
Provident Fund Contribution for 1931 ..				655	5	0
Building Repair Fund Account				2,000	0	0
TO SUNDRY ADJUSTMENTS.						
Bad Debts written-off				1,285	3	0
Depreciation of Investments revalued on 31-12-31				31,720	7	0
Balance as per Balance Sheet				1,57,960	10	11
TOTAL ..				2,44,181	3	2

STATEMENT No. 1.

of Bengal. *1931.*

Cr.

	Rs.	As.	P.	Rs.	As.	P.
By Balance from last Account				1,79,408	8	2
By Cash Receipts.						
Advertising	9,600	0	0			
Interest on Investments	10,014	1	0			
Interest on Fixed Deposits ..	2,141	12	3			
Miscellaneous	600	12	6			
Government Allowance	2,000	0	0			
Donation	100	0	0			
Rent	9,300	0	0			
				33,756	9	9
By Personal Account.						
Members' Subscriptions	14,455	0	0			
Compounding Subscriptions ..	300	0	0			
Admission Fees	544	0	0			
Institutional Membership Fees ..	150	0	0			
				15,449	0	0
By Transfer from Funds.						
Proportionate Share in General Expenditure	10,000	0	0			
Publication Fund for Publications ..	5,567	1	3			
				15,567	1	3
TOTAL ..				2,44,181	3	2

STATEMENT No. 2.

1931. *Oriental Publication*

From a monthly grant made by the Government of Bengal for the publi-
(Rs. 500), and for the publication of Sanskrit

Dr.

	Rs.	As.	P.	Rs.	As.	P.
To Balance from last Account				1,128	13	10
TO CASH EXPENDITURE.						
Printing	9,428	14	0			
Editing	1,191	8	0			
				10,620	6	0
To Proportionate Share in General Expenditure				3,000	0	0
TOTAL ..				14,749	3	10

STATEMENT No. 3.

1931. *Oriental Publication*

From a monthly grant made by the Government of Bengal of
Historical

Dr.

TO CASH EXPENDITURE.

	Rs.	As.	P.
Printing	3,939	7	6
To Balance as per Balance Sheet	383	14	3
TOTAL ..	4,323	5	9

STATEMENT No. 2.

Fund, No. 1, in Account with A.S.B. *1931.*

cation of Oriental Works and Works of Instruction in Eastern Languages
Works hitherto unpublished (Rs. 250).

Cr.

BY CASH RECEIPTS.

	Rs. As. P.	Rs.	As.	P.
Annual Grant		9,000	0	0
By Balance as per Balance Sheet		5,749	3	10
TOTAL ..		14,749	3	10

STATEMENT No. 3.

Fund, No. 2, in Account with A.S.B. *1931.*

Rs. 250 for the publication of Arabic and Persian Works of Interest.

Cr.

	Rs.	As.	P.
By Balance from last Account	1,323	5	9
BY CASH RECEIPTS.			
Annual Grant for 1931-32	3,000	0	0
TOTAL ..	4,323	5	9

STATEMENT No. 4.

1931. *Sanskrit Manuscripts Fund*

From an annual grant of Rs. 3,200 made by the Government of Bengal
by the Society ; and Rs. 3,600 from the

Dr.

To Cash Expenditure.

	Rs.	As.	P.	Rs.	As.	P.
Pension	120	0	0			
Printing	5,827	9	0			
Allowance	3,900	0	0			
				8,947	9	0
To Proportionate Share in General Expenditure				2,000	0	0
To Balance as per Balance Sheet				13,869	4	3
TOTAL ..				24,816	13	3

STATEMENT No. 5.

1931. *Arabic and Persian Manuscripts*

From an annual grant of Rs. 5,000 made by the Government of India for
by the Society ; for the purchase of further Manuscripts,
Manuscripts found in

Dr.

	Rs.	As.	P.	Rs.	As.	P.
To Balance from last Account				251	13	3

To Cash Expenditure.

Manuscripts Purchase	799	0	0			
Binding	200	8	0			
				999	8	0
To Proportionate Share in General Expenditure				2,500	0	0
To Balance as per Balance Sheet				1,248	10	9
TOTAL ..				5,000	0	0

STATEMENT No. 4.

Account, in Account with A.S.B. *1931.*

for the publication of the Catalogue of Sanskrit Manuscripts acquired
same Government for Research Work.

Cr.

	Rs. As. P.	Rs. As. P.
By Balance from last Account ..	..	18,016 13 3
BY CASH RECEIPTS.		
Annual Grant for Research Work, 1931-32	3,600 0 0	
" " " Cataloguing, 1931-32	3,200 0 0	
		6,800 0 0
TOTAL	..	24,816 13 3

STATEMENT No. 5.

Fund Account, in Account with A.S.B. *1931.*

the cataloguing and binding of Arabic and Persian Manuscripts, acquired
and for the preparation of notices of Arabic and Persian
various Libraries in India.

Cr.

BY CASH RECEIPTS.

	Rs. As. P.	Rs. As. P.
Government Allowance for 1931-32 ..	..	5,000 0 0
TOTAL	..	5,000 0 0

STATEMENT No. 6.

1931. *Barclay Memorial*

From a sum of Rs. 500 odd given in 1896 by the Surgeon
encouragement of Medical

Dr.

To Cash Expenditure.

	Rs. As. P.	Rs. As. P.
Purchase of Investments	..	62 6 4
To Depreciation of Investments revalued on 31-12-31	..	75 15 4
To Balance as per Balance Sheet—		
Rs. 400, 3½% G.P.N., 1854-55 „ 100, „ „ 1900-01 „ 100, „ „ 1865 „ 100, „ „ 1854-55 ..	367 1 0	
Accumulated Cash Balance ..	52 8 4	
		419 9 4
Total ..		557 15 0

STATEMENT No. 7.

1931. *Servants' Pension Fund*

Founded in 1876 as the Piddington Pension Fund

Dr.

To Cash Expenditure.

	Rs. As. P.	Rs. As. P.
Purchase of Investments	..	311 15 5
To Depreciation of Investments revalued on 31-12-31	..	269 12 5
To Balance as per Balance Sheet—		
Rs. 2,000, 3½% G.P.N. Rs. 500, 3½% G.P.N. ..	1,310 15 0	
Accumulated Cash Balance ..	100 4 8	
		1,411 3 8
Total ..		1,992 15 6

STATEMENT No. 6.

Fund' Account, in Account with A.S.B. *1931.*

General, I.M.S., for the foundation of a medal for the
and Biological Science.

Cr.

	Rs.	As.	P.	Rs.	As.	P.
By Balance from last Account				475	4	8
By Cash Receipts.						
Interest realized for the year				20	4	0
Purchase of Investments credited at cost ..				62	6	4
Total ..				557	15	0

STATEMENT No. 7.

Account, in Account with A.S.B. *1931.*

with Rs. 500 odd from the Piddington Fund.

Cr.

	Rs.	As.	P.	Rs.	As.	P.
By Balance from last Account				1,603	5	1
By Cash Receipts.						
Interest realized for the year				77	11	0
Purchase of Investments credited at cost ..				311	15	5
Total ..				1,992	15	6

STATEMENT No. 8.

1931. *Annandale Memorial Fund*

From donations by subscription,

Dr.

To Cash Expenditure.

	Rs.	As.	P.	Rs.	As.	P.
Cost of a Medal	128	12	0			
Purchase of Investments	623	14	11			
				752	10	11
To Depreciation of Investments revalued on 31-12-31	..			429	8	11
To Balance as per Balance Sheet—						
Rs. 3,000, 3½% G.P.N. Rs. 1,000, 3½% G.P.N. ..	2,097	8	0			
Less Cash Advance	26	12	11			
				2,070	11	1
Total ..				3,252	14	11

STATEMENT No. 9.

1931. *Permanent Library Endowment*

From gifts received,

Dr.

To Cash Expenditure.

	Rs.	As.	P.	Rs.	As.	P.
Purchase of Investments	..			623	14	11
To Depreciation of Investments revalued on 31-12-31	..			1,309	8	11
To Balance as per Balance Sheet—						
Rs. 11,000, 3½% G.P.N. Rs. 1,000, 3½% G.P.N. ..	6,292	8	0			
Accumulated Cash Balance ..	282	13	6			
				6,575	5	6
Total ..				8,508	13	4

STATEMENT No. 8.

Account, in Account with A.S.B. *1931.*

started in 1926.

Cr.

		Rs. As. P.	Rs. As. P.
By Balance from last Account	..	..	2,524 8 0
By Cash Receipts.			
Interest realized for the year	..	..	104 8 0
Purchase of Investments credited at cost		..	623 14 11
Total		..	3,252 14 11

STATEMENT No. 9.

Fund Account, in Account with A.S.B. *1931.*

started in 1926.

Cr.

		Rs. As. P.	Rs. As. P.
By Balance from last Account	..	..	7,501 10 5
By Cash Receipts.			
Interest realized for the year	..	..	383 4 0
Purchase of Investments credited at cost		..	623 14 11
Total		..	8,508 13 4

STATEMENT No. 10.

1931. *Sir William Jones Memorial*

From a sum gifted for the purpose in

Dr.

To Cash Expenditure.

	Rs.	As.	P.	Rs.	As.	P.
Cost of a Medal	..			186	4	0
To Depreciation of Investments revalued on 31-12-31	..			330	0	0
To Balance as per Balance Sheet—						
Rs. 3,000, 3½% G.P.N. ..	1,573	2	0			
Accumulated Cash Balance ..	112	2	0			
				1,685	4	0
TOTAL	..			2,201	8	0

STATEMENT No. 11.

1931. *Joy Gobind Law Memorial*

From a donation for the purpose

Dr.

	Rs.	As.	P.	Rs.	As.	P.
To Depreciation of Investments revalued on 31-12-31	..			330	0	0
To Balance as per Balance Sheet—						
Rs. 3,000, 3½% G.P.N. ..	1,573	2	0			
Less Cash Advance	108	12	0			
				1,464	6	0
TOTAL	..			1,794	6	0

STATEMENT No. 10.

Fund Account, in Account with A.S.B. *1931.*

1926, by Dr. U. N. Brahmachari.

Cr.

	Rs. As. P.	Rs. As. P.
By Balance from last Account ..	..	2,097 1 0
By Cash Receipts.		
Interest realized for the year ..	..	104 7 0
Total ..		2,201 8 0

STATEMENT No. 11.

Fund Account, in Account with A.S.B. *1931.*

by Dr. Satya Churn Law, 1929.

Cr.

	Rs. As. P.	Rs. As. P.
By Balance from last Account ..	..	1,690 2 0
By Cash Receipts.		
Interest realized for the year ..	..	104 4 0
Total ..		1,794 6 0

STATEMENT No. 12.

1931. *Akbarnama Reprint*

From a sum set apart in 1923 for

Dr.

			Rs. As. P.
To Balance as per Balance Sheet	..	..	7,764 10 8
	TOTAL	..	7,764 10 8

STATEMENT No. 13.

1931. *Building Fund*

From a sum of Rs. 40,000 given by the Government of India
proceeds of a portion

Dr.

			Rs. As. P.
To Balance as per Balance Sheet	..	..	11,124 4 6
	TOTAL	..	11,124 4 6

STATEMENT No. 14.

1931. *Calcutta Science Congress Prize*

Dr.

		Rs. As. P.	Rs. As. P.
To Depreciation of Investments revalued on 31-12-31	..	..	330 0 0
To Balance as per Balance Sheet—			
Rs. 3,000, 3½% G.P.N.	..	1,573 2 0	
Accumulated Cash Balance	..	255 3 7	
			1,828 5 7
TOTAL	..		2,158 5 7

STATEMENT No. 12.

Account, in Account with A.S.B. 1931.

the reprint of the Akbarnama in England.

Cr.

	Rs.	As.	P.
By Balance from last Account	7,764	10	8
TOTAL ..	7,764	10	8

STATEMENT No. 13.

Account, in Account with A.S.B. 1931.

towards the rebuilding of the Society's premises, and from the sale of the Society's land.

Cr.

	Rs.	As.	P.
By Balance from last Account	11,124	4	6
TOTAL ..	11,124	4	6

STATEMENT No. 14.

Fund Account, in Account with A.S.B. 1931.

Cr.

	Rs.	As.	P.	Rs.	As.	P.
By Balance from last Account				2,054	1	7
BY CASH RECEIPTS.						
Interest realized for the year				104	4	0
TOTAL ..				2,158	5	7

STATEMENT No. 15.

1931. *Dr. Brühl Memorial*

From a sum gifted for the purpose by

Dr.

To Cash Expenditure.

	Rs. As. P.	Rs. As. P.
Cost of a Photograph	..	6 0 0
To Depreciation of Investments revalued on 31-12-31	..	110 0 0
To Balance as per Balance Sheet—		
Rs. 1,000, 3½% G.P.N.	524 6 0	
Accumulated Cash Balance ..	277 8 0	
		801 14 0
Total	..	917 14 0

STATEMENT No. 16.

1931. *Building Repair*

Dr.

	Rs. As. P.
To Balance as per Balance Sheet	4,000 0 0
Total ..	4,000 0 0

STATEMENT No. 17.

1931. *Catalogue of Scientific Serial Pub-*

Dr.

	Rs. As. P.
To Transfer to the Publication Fund Account ..	415 0 0
Total ..	415 0 0

STATEMENT No. 15.

Fund Account, in Account with A.S.B. *1931.*

the Brühl Farewell Committee, 1929.

Cr.

			Rs.	As.	P.	Rs.	As.	P.
By Balance from last Account	..	..				883	4	0
BY CASH RECEIPTS.								
Interest realized for the year	..	..				34	10	0
TOTAL	..					917	14	0

STATEMENT No. 16.

Fund Account, in Account with A.S.B. *1931.*

Cr.

			Rs.	As.	P.
By Balance from last Account	..	..	2,000	0	0
By Transfer from the A.S.B.	..	..	2,000	0	0
TOTAL	..		4,000	0	0

STATEMENT No. 17.

lications, Calcutta, in Account with A.S.B. *1931.*

Cr.

			Rs.	As.	P.
By Balance from last Account	..	..	415	0	0
TOTAL	..		415	0	0

STATEMENT No. 18.

1931. International Catalogue of Scien-

Dr.

To Cash Expenditure.

	Rs.	As.	P.
Salaries	50	0	0
To Balance as per Balance Sheet	4,374	7	8
Total ..	4,424	7	8

STATEMENT No. 19.

1931. Current Deposit Account, Chartered Bank of

From a sum set aside to pay for the

Dr.

	Rs.	As.	P.	Rs.	As.	P.
To Balance from last Account ..	..			4,272	0	3
To Interest on Deposit, London ..	84	11	0			
To Exchange difference	0	9	3			
				85	4	3
Total ..				4,357	4	6

STATEMENT No. 20.

1931. Provident Fund Ac-

From contributions by the

Dr.

	Rs.	As.	P.	Rs.	As.	P.
To Depreciation of Investments revalued on 31-12-31	..			225	0	0
To Balance as per Balance Sheet—						
Rs. 5,000, 4½% G.P.N. ..	4,525	0	0			
Accumulated Cash Balance ..	3,729	11	0	8,254	11	0
Total ..				8,479	11	0

STATEMENT No. 18.

tific Literature, in Account with A.S.B. *1931.*

Cr.

	Rs.	As.	P.
By Balance from last Account	4,424	7	8
TOTAL ..	4,424	7	8

STATEMENT No. 19.

India, Australia and China, London. *1931.*

printing of the Kashmiri Dictionary.

Cr.

BY CASH RECEIPTS.

	Rs.	As.	P.	Rs.	As.	P.
Printing Charges				826	0	0
By Balance as per Balance Sheet				3,531	4	6
TOTAL ..				4,357	4	6

STATEMENT No. 20.

count, in Account with A.S.B. *1931.*

Society and its Staff.

Cr.

	Rs.	As.	P.	Rs.	As.	P.
By Balance from last Account				6,872	12	0
BY CASH RECEIPTS.						
Staff Contribution for the year ..	655	5	0			
A.S.B. Contribution for the year ..	655	5	0			
Interest on Investments realized during the year	198	1	0	1,508	11	0
By interest realized for 1930, from the Imperial Bank of India				98	4	0
TOTAL ..				8,479	11	0

STATEMENT No. 21.

1931. *Advances*

Dr.

	Rs.	As.	P.
To Balance from last Account	250	0	0
To Cash Expenditure.			
Advances	510	0	0
Total ..	760	0	0

STATEMENT No. 22.

1931. *Personal*

Dr.

	Rs.	As.	P.	Rs.	As.	P.
To Balance from last Account ..	..			4,414	12	9
To Advances	..			1,513	15	9
To Asiatic Society's Subscriptions, etc.	15,449	0	0			
To Subscriptions to Journal and Proceedings and from Book Sales, etc., from Publication Fund	5,567	1	3	21,016	1	3
Total ..				26,944	13	9

STATEMENT No. 21.

Account, in Account with A.S.B. *1931.*

Cr.

			Rs.	As.	P.
By Balance as per Balance Sheet	..	..	760	0	0
	TOTAL	..	760	0	0

STATEMENT No. 22.

Account. *1931.*

Cr.

		Rs.	As.	P.	Rs.	As.	P.
By Cash Receipts during the year	..	..			20,672	12	0
By Bad Debts written off, A.S.B.	..	1,285	3	0			
By Books returned, etc. ..	..	197	8	0			
					1,482	11	0

By Outstandings.	Amount due to the Society.			Amount due by the Society.		
	Rs.	As.	P.	Rs.	As.	P.
Members ...	4,305	5	0	496	15	6
Subscribers	...	...	..	72	0	0
Bill Collector's Deposit ...	...	.	...	270	0	0
Miscellaneous ...	1,631	5	9	308	4	6
	5,936	10	9	1,147	4	0

		Rs.	As.	P.
By Balance	..	4,789	6	9
TOTAL	..	26,944	13	9

STATEMENT No. 23.

1931. *Publication Fund*

From sale proceeds

Dr.

To Cash Expenditure.

	Rs.	As.	P.	Rs.	As.	P.
Printing	..			826	0	0
To Proportionate Share in General Expenditure	2,500	0	0			
To Publications of the A.S.B. ..	5,567	1	3			
To Books returned, etc.	197	8	0			
				8,264	9	3
To Balance as per Balance Sheet ..	..			3,535	10	9
Total ..				12,626	4	0

STATEMENT No. 24.

1931. *(1) Investment Account*

Dr.

	Rs.	As.	P.
To Balance from last Account	1,872	12	0
To deposits of Contributions, during the year ..	1,411	11	0
To Interest realized for the year 1930	98	4	0
Total ..	3,382	11	0

STATEMENT No. 23.

Account, in Account with A.S.B. *1931.*

of publications.

Cr.

	Rs. As. P.	Rs. As. P.
By Balance from last Account		6,156 6 9
By Cash Receipts.		
Cash Sales of Publications		402 7 9
By Personal Account.		
Credit Sales of Publications, etc. ..	3,940 6 3	
Subscriptions to Journal and Proceedings	1,452 0 0	
Institutional Members' Subscriptions ..	96 0 0	
Miscellaneous	78 11 0	
		5,567 1 3
By Transfer.		
By Interest on Fixed Deposit, London	84 11 0	
By Exchange difference	0 9 3	
By Transfer of accumulated balance from the Account of the Catalogue of Scientific Serial Publications, Calcutta ..	415 0 0	
		500 4 3
Total ..		12,626 4 0

STATEMENT No. 24.

(Savings Bank Deposit, Imperial Bank of India). *1931.*

Cr.

By Cash Receipts.

	Rs. As. P.
By withdrawal of deposits for Staff Advance ..	510 0 0
By Balance as per Balance Sheet	2,872 11 0
Total ..	3,382 11 0

STATEMENT No. 25.

1931. *(2) Investment Account*

Dr.

	Rs.	As.	P.
To Balance from last Account	37,853	14	9
To Cash Expenditure.			
Fixed Deposits	30,543	9	0
Total ..	68,397	7	9

STATEMENT No. 26.

1931. *(3) Investment Account*

Dr.

	Rs.	As.	P.
To Cash Expenditure.			
Purchase of Treasury Bills	57,064	1	0
Total ..	57,064	1	0

STATEMENT No. 25.

(*Fixed Deposit with Central Bank of India*). *1931.*

Cr.

BY CASH RECEIPTS.

	Rs.	As.	P
Withdrawal of Deposits	62,371	9	6
By Balance as per Balance Sheet	6,025	14	3
TOTAL ..	68,397	7	9

STATEMENT No. 26.

(*Government of India Treasury Bills*). *1931.*

Cr.

BY CASH RECEIPTS.

	Rs.	As.	P.
Treasury Bills realized on Maturity	32,501	9	0
By Balance as per Balance Sheet	24,562	8	0
TOTAL .	57,064	1	0

STATEMENT No. 27.

1931. (4) *Investment*

Dr.

	Rs.	As.	P.
To Balance from last Account	2,03,738	11	0
To Purchase of Investments for various Fund Accounts at cost	1,622	3	7
TOTAL ..	2,05,360	14	7

Face Value Rs.	FUNDS.	Rate @ Rs. %	31st December, 1931, Valuation.			31st December, 1930, Valuation (plus purchased during the year Rs. 1,622-3-7)			Depreciation on 31st December 1931.		
			Rs.	A.	P.	Rs.	A.	P.	Rs.	A.	P.
	ASIATIC SOCIETY OF BENGAL.										
	PERMANENT RESERVE.										
16,700	3½% G. Loan No 155119, 1842-43 ..	52/7/-	1,29,037	3	0	1,56,327	8	0	27,290	5	0
1,00,000	3½% G. Loan No. 216811, 1854-55	52/7/-									
53,700	3½% G. Loan No. 216812, 1854-55 ...	52/7/-									
5,000	3½% G. Loan No. 029544, 1879 ...	52/7/-									
1,000	3½% G. Loan No 029548, 1879 ..	52/7/-									
44,300	3½% G. Loan No. 337428, 1865 ..	52/7/-									
25,000	3½% G. Loan No. 238369, 1900-01 ...	52/7/-									
300	3½% G. Loan Part of No. 238816, 1900-01	52/7/-									
500	3% G. Loan No. 093715, 1896-97 ...	46/1/-									
	TEMPORARY RESERVE.										
25,700	3½% G. Loan Part of No. 238816, 1900-01	52/7/-	13,476	7	0	16,303	7	0	2,827	0	0
11,400	4½% G. Loan, 1955-60	69/2/-	7,880	4	0	9,483	6	0	1,603	2	0
	PENSION FUND.										
2,000	3½% G. Loan No. 029546, 1879 ...	52/7/-	1,048	12	0	1,268	12	0	220	0	0
500	3½% G. Loan No. 244056, 1854-55 ...	52/7/-	262	3	0	311	15	5	49	12	5
	BARCLAY MEMORIAL FUND.										
300	3½% G. Loan No. 170971, 1854-55	52/7/-	314	10	0	380	10	0	66	0	0
100	3½% G. Loan No. 220763, 1854-55 ..	52/7/-									
100	3½% G. Loan No. 304677, 1900-01	52/7/-									
100	3½% G. Loan No. 354795, 1865 ..	52/7/-									
100	3½% G. Loan No. 243773, 1854-55 ...	52/7/-	52	7	0	62	6	4	9	15	4
	SIR WILLIAM JONES MEMORIAL FUND.										
1,500	3½% G. Loan No. 188719, 1854-55 ...	52/7/-	1,573	2	0	1,903	2	0	330	0	0
1,500	3½% G. Loan Nos. 285807, 292707, 1900-01	52/7/-									
	ANNANDALE MEMORIAL FUND.										
3,000	3½% G. Loan Nos. 195892, 195893, 195907, 1842-43	52/7/-	1,573	2	0	1,903	2	0	330	0	0
1,000	3½% G. Loan No. 222872, 1854-55 ...	52/7/-	524	6	0	623	14	11	99	8	11
	PERMANENT LIBRARY ENDOWMENT FUND.										
5,000	3½% G. Loan No. 230065, 1854-55 ..	52/7/-	5,768	2	0	6,978	2	0	1,210	0	0
2,000	3½% G. Loan Nos. 231119, 230787, 1854-55	52/7/-									
1,000	3½% G. Loan No. 234698, 1854-55 ...	52/7/-									
3,000	3½% G. Loan Nos. 235353-55, 1854-55	52/7/-									
1,000	3½% G. Loan No. 222874, 1854-55	52/7/-	524	6	0	623	14	11	99	8	11
	CALCUTTA SCIENCE CONGRESS PRIZE FUND.										
3,000	3½% G. Loan No. 235851, 1854-55 ...	52/7/-	1,573	2	0	1,903	2	0	330	0	0
	DR. BRÜHL MEMORIAL FUND.										
1,000	3½% G. Loan No. 235843, 1854-55 ...	52/7/-	524	6	0	634	6	0	110	0	0
	JOY GOBIND LAW MEMORIAL MEDAL FUND.										
1,000	3½% G. Loan No. 213534, 1854-55	52/7/-	1,573	2	0	1,903	2	0	330	0	0
1,000	3½% G. Loan No. 213535, 1854-55 ...	52/7/-									
500	3½% G. Loan No. 213536, 1854-55 ...	52/7/-									
500	3½% G. Loan No. 219673, 1854-55 ...	52/7/-									
	PROVIDENT FUND ACCOUNT.										
5,000	4½% G. Loan No. G. 004779-83, 1934 ..	90/8/-	4,525	0	0	4,750	0	0	225	0	0
									35,180	4	7
3,17,800			1,70,230	10	0	2,05,360	14	7			

STATEMENT No. 27.

Account (Government Securities). *1931.*

Cr.

	Rs.	As.	P.
By Depreciation on Investments revalued on 31st December, 1931	35,130	4	7
By Balance as per Balance Sheet	1,70,230	10	0
TOTAL ..	2,05,360	14	7

STATEMENT No. 28.

1931. *Cash*

For the year to 31st

Dr.

To	Rs.	As.	P.	Rs.	As.	P.
Balance from last Account	..			2,552	11	8
Asiatic Society of Bengal	33,756	9	9			
Oriental Publication Fund No. 1 Account	9,000	0	0			
Oriental Publication Fund No. 2 Account	3,000	0	0			
Sanskrit Manuscripts Fund Account ..	6,800	0	0			
Arabic and Persian Manuscripts Fund Account	5,000	0	0			
Barclay Memorial Fund Account ..	20	4	0			
Servants' Pension Fund Account ..	77	11	0			
Annandale Memorial Fund Account ..	104	8	0			
Permanent Library Endowment Fund Account	383	4	0			
Sir William Jones Memorial Fund Account	104	7	0			
Joy Gobind Law Memorial Fund Account	104	4	0			
Calcutta Science Congress Prize Fund Account	104	4	0			
Dr. Brühl Memorial Fund Account ..	34	10	0			
Deposit Account, Chartered Bank of India, Australia, and China ..	826	0	0			
Provident Fund Account	1,508	11	0			
Savings Bank Deposit Account, Imperial Bank of India	510	0	0			
Personal Account	20,672	12	0			
Publication Fund Account	402	7	9			
Fixed Deposit, Central Bank of India, Account	62,371	9	6			
Government Treasury Bills Account ..	32,501	9	0			
				1,77,282	15	0
TOTAL ..				1,79,835	10	8

STATEMENT No. 28.

Account. *1931.*

December, 1931.

Cr.

By	Rs. As. P.	Rs. As. P.
Asiatic Society of Bengal	51,214 14 3	
Oriental Publication Fund No. 1 Account	10,620 6 0	
Oriental Publication Fund No. 2 Account	3,939 7 6	
Sanskrit Manuscripts Fund Account ..	8,947 9 0	
Arabic and Persian Manuscripts Fund Account	999 8 0	
Barclay Memorial Fund Account ..	62 6 4	
Servants' Pension Fund Account ..	311 15 5	
Annandale Memorial Fund Account ..	752 10 11	
Permanent Library Endowment Fund Account	623 14 11	
Sir William Jones Memorial Fund Account	186 4 0	
Dr. Brühl Memorial Fund Account ..	6 0 0	
International Catalogue of Scientific Literature Account	50 0 0	
Advances Account	510 0 0	
Savings Bank Deposit Account, Imperial Bank of India	1,411 11 0	
Personal Account	1,513 15 9	
Publication Fund Account	826 0 0	
Fixed Deposit, Central Bank of India, Account	30,543 9 0	
Government Treasury Bill Account ..	57,064 1 0	
		1,69,584 5 1
Balance	..	10,251 5 7
TOTAL ..		1,79,835 10 8

[APPENDIX IV.]

Abstract Proceedings Council, 1931.

(Rule 48 f.)

ANNUAL MEETING—

Letter from the Private Secretary to H.E. the Governor of Bengal intimating that His Excellency has consented to preside over the Society's Annual Meeting to be held on the 1st Monday of February, 1931. Record.
No. 1. 26-1-31.

Annual Report. Approved.
No. 19. 26-1-31.

Annual Meeting, 1931. Arrangements approved.
No. 20. 26-1-31.

Letter from the Private Secretary to H.E. the Governor of Bengal intimating acceptance by H.E. to invitation to preside over the Society's Annual Meeting to be held in February, 1932. Record.
No. 1. 23-12-31.

ARCHIVES—

Memorandum regarding the archives of the Society. Work as outlined in the memorandum is to be considered important and should be continued.
No. 5. 28-9-31.

BIBLIOTHECA INDICA—

Request from the Panjab University to be permitted to reprint certain portion of an Arabic work by Tabrizi published in the Bibliotheca Indica. Grant. Usual acknowledgment to be made.
No. 3. 27-4-31.

Notice in the Catalogue of Messrs. Bernard Quaritch, Ltd., London, offering for sale of almost complete set of the Bibliotheca Indica. Record.
No. 1. 27-7-31.

Letter from Sir Jadunath Sirkar suggesting the publication of certain works in the Bibliotheca Indica. The Council's thanks to be conveyed to Sir Jadunath. Intimation to be added that on account of present financial conditions the question will be re-considered next year, and that the Index to the Akbarnama will be undertaken by Prof. Mahfuz-ul-Haq. The latter's offer to complete the Index to be accepted with thanks.
No. 7. 28-9-31.

Report of completion of Dr. M. Hidayat Hosain's edition of the Persian text of the Ma'asir-i-Rahimi in the Bibliotheca Indica. The Council's congratulations to be conveyed to Dr. Hidayat Hosain.
No. 4. 30-11-31.

Report completion of Prof. Dr. W. Caland's English translation of the Pancavimsa Brahmana in the Bibliotheca Indica. Record.
No. 5. 30-11-31.

Letter of appreciation from Prof. Dr. W. Caland regarding the issue of Pancavimsa Brahmana. Record.
No. 6. 30-11-31.

BUILDING—

Finance Committee No. 4 (d) of 25-11-31. Building Repairs. Recommendation : Building repairs to be taken in hand at once. Accept estimates from Martin & Co., question of partial or complete repair to Malthoid covering to be decided after receipt of advice from supervisor. In the event of replacement of beams proving necessary, estimates to be called for, also estimates for any additional item suggested in the course of the work to be called for. Council order : Accept.
No. 17. 30-11-31.

Letter from Messrs. M. C. Bose & Brothers asking to be allowed to quote for repairs to the Society's buildings. No action.
No. 28. 30-11-31.

Finance Committee No. 4 (1) of 16-12-31. Society's contribution to the Building Repair Fund Account as per estimate. Recommendation : That the new budget for 1932 include a sum of Rs. 2,000 under this head, not to be spent on the current repairs. That the present repairs be paid for from Rs. 4,000 accumulated in the Building Repair Fund Account during 1930 and 1931 and that in view of the present exceptional financial condition the balance due be drawn from the balance standing to the credit of the Building Fund Account. Council order : Accept.
No. 9. 23-12-31.

Report progress Building Repairs. Report noted. Unsafe rafters to be replaced by steel girders wherever necessary. Total cost to be met from Rs. 4,000 standing to the credit of the Building Repair Fund Account, balance from the assets in the Building Fund Account. The 1932 budget allowance of Rs. 2,000 for the Building Repair Fund not to be used for these payments.
No. 3. 23-12-31.

COINS—

Letter from the Director-General of Archæology in India concerning the Society's Coin Cabinet. Reply approved.
No. 6. 30-3-31.

COMMITTEES—

Constitution of the Standing Committees of the Society for 1931-32. The Standing Committees, 1931-32, to be constituted as follows :—

Finance Committee—

President } *Ex-officio.*
Treasurer }
Gen. Secretary }
MM. H. P. Shastri.
Mr. J. C. Mitra.
Mr. James Insch.

Library Committee—

President }
Treasurer } *Ex-officio.*
Gen. Secretary }
Phil. Secretary.
Jt. Phil. Secretary.
Nat. Hist. Bio. Secretary.
Nat. Hist. Sci. Secretary.
Anthropological Secretary.
Medical Secretary.
Library Secretary.
Sir C. C. Ghose.

Publication Committee—

President }
Treasurer } *Ex-officio.*
Gen. Secretary }
Phil. Secretary.
Jt. Phil. Secretary.
Nat. Hist. Bio. Secretary.
Nat. Hist. Sci. Secretary.
Anthropological Secretary.
Medical Secretary.
Library Secretary.
Dr. U. N. Brahmachari.

No. 5. 23-2-31.

CONDOLENCE—

Notice of decease of Lt.-Col. Auguste Bonifacy. Send letter of condolence, and announce in next General Meeting.
No. 2. 29-6-31.

Death of Pt. Lakshman Shastri Dravid. Send letter of condolence and announce in next General Meeting.
No. 3. 29-6-31.

Report death of two relations of the Society and local press notices relating thereto. Record, with an expression of the Council's regrets.
No. 8. 30-11-31.

Letter from Lt.-Col. R. B. S. Sewell regarding the death of Mrs. Sewell. Record, with an expression of the Council's regrets.
No. 9. 30-11-31.

Report death of MM. Haraprasad Shastri (Circular No. 107), and press notices regarding it. Unanimously resolved :—

That the Council places on record its love and respect for the late Mahamahopadhaya Haraprasad Shastri, its sense of irreparable loss to the scholarly world in general and the Asiatic Society of Bengal in particular caused by his departure, and its heartfelt condolences with the family of the deceased scholar in their bereavement;

That a copy of this resolution be forwarded to the family;

That the next General Meeting of the Society be devoted to the commemoration of the great scholar;

And that the Council do consider what suitable steps may be taken to perpetuate his memory.

Also resolved that the General Secretary do look up the precedents of memorials to deceased distinguished Members instituted by the Society and communicate these to a Sub-Committee to be suggested by the President and to be charged with the taking of steps to institute a suitable memorial to the memory of the late MM. H. P. Shastri.
No. 10. 30-11-31.

CONGRATULATIONS AND THANKS—

Letter of thanks from the President, Royal Society of Tropical Medicine and Hygiene, for the Society's donation for the proposed Patrick Manson House. Record.
No. 2. 26-1-31.

Letter of thanks from the 18th Indian Science Congress, Nagpur. Record.
No. 3. 26-1-31.

Presentation to the Society of a copy of Memoirs, Indian Medical Research, by its author, Lt.-Col. R. Knowles. The Council's thanks to be conveyed to Lt.-Col. Knowles, and the Council's congratulations to the author.
No. 5. 26-1-31.

The President expressed his thanks to the outgoing members of Council for their services rendered to the Society and for their valued support of himself as President and Chairman of the meetings of Council.
No. 23. 26-1-31.

Signature signifying acceptance of the election to Council by the Council Members. Record. Vote of thanks to be sent to the outgoing members.
No. 1. 23-2-31.

Letter of thanks from Sir Jivanji Jamshedji Modi for his election as an Honorary Fellow of the Society. Record.
No. 1. 30-3-31.

Letter of thanks from Sir C. V. Raman for the congratulations addressed to him by the Society. Record.
No. 2. 30-3-31.

Letter of thanks from Messrs. B. De and A. W. Young for the vote of thanks addressed to them by the Council for the services rendered by them as members of Council. Record.
No. 3. 30-3-31.

Letter of thanks from Col. Chopra for his election as an Ordinary Fellow of the Society. Record.
No. 4. 30-3-31.

Presentation to the Society by Mr. James Insch of the New English Dictionary, twelve volumes. On proposal of Sir C. C. Ghose a hearty vote of thanks to be communicated to the generous donor.
No. 14. 30-3-31.

Letter of thanks from Mr. James Insch. Record.
No. 1. 27-4-31.

Letter of thanks from the Indian Historical Records Commission for the loan of exhibits by the Society. Record.
No. 2. 27-4-31.

Congratulatory letter to MM. H. P. Shastri from Lord Lytton in connection with the issue of the Sixth Volume of Catalogue of the Society's Sanskrit Manuscripts. Record.
No. 4. 29-6-31.

Presentation of a MS. copy of the Arabic Version of Euclid by Mr. James Insch. Cordial thanks to the donor.
No. 14. 29-6-31.

Report regarding presentation of the Society at the forthcoming centenary celebration of the British Association for the Advancement of Science in London. Record. The Council's thanks to be conveyed to the Members of the Committee.
No. 2. 27-7-31.

Letter of thanks from Dr. S. W. Kemp for the award to him of the Barclay Memorial Medal. Record.
No. 2. 31-8-31.

Letter from the Consul-General for the Netherlands at Calcutta thanking the Society on behalf of the Governor-General of the Dutch East Indies for the help and assistance given to Prof. Van Kan. Record.
No. 3. 31-8-31.

Letter from Dr. Brahmachari regarding his discovery of the omission of an early President of the Society in the Society's succession list of Presidents. Record with thanks.
No. 2. 28-9-31.

Letter of thanks to the Society from the President of the British Association for the Advancement of Science, London. Record.
No. 2. 30-11-31.

Report of completion of Dr. M. Hidayat Hosain's edition of the Persian text of the Ma'asir-i-Rahimi in the Bibliotheca Indica. The Council's congratulations to be conveyed to Dr. Hidayat Hosain.
No. 4. 30-11-31.

Letters from Dr. U. N. Brahmachari offering to the Society a series of photographic reproductions of the Society's past Presidents. Proposed by Sir C. C. Ghose and unanimously resolved that the gift be accepted; that the Council's grateful thanks be conveyed to the donor, and that the photographs be suitably hung in the Society's building after consultation with Mr. Percy Brown.
No. 7. 30-11-31.

COUNCIL—

Letter from the Hon'ble Mr. B. B. Ghose intimating acceptance of his candidature for Council Membership, 1931-32. Record with satisfaction.
No. 4. 26-1-31.

Signature signifying acceptance of the election to Council by the Council Members. Record. Vote of thanks to be sent to the outgoing members.
No. 1. 23-2-31.

Absence of Col. Knowles, Medical Secretary. Leave of absence for six months.
No. 16. 27-4-31.

Vacancy Council. Vacancy not to be filled up for the moment.
No. 7. 27-4-31.

Absence of Treasurer from Calcutta. Resolved: That the General Secretary (Mr. Johan van Manen) be authorized to officiate as Honorary Treasurer to the Society during the absence of the Honorary Treasurer, Mr. K. C. Mahindra, from Tuesday, the 26th May, 1931, until notification of the latter's return to Calcutta and resumption of office.
No. 9. 25-5-31.

Absence of the General Secretary from Calcutta. The General Secretary to arrange absence on leave with the President or his substitute.
No. 13. 31-8-31.

Absence of the President from India for urgent private reasons. On the proposal of Sir C. C. Ghose, seconded by Dr. Brahmachari, unanimously resolved to express the Council's deep sympathy with Col. Sewell in the present circumstances, its great appreciation of his valuable services rendered to the Society during the term of office as President, and its hopes for his speedy return to India under happier conditions. Further resolved that during Col. Sewell's absence for the remainder of the year, in application of Rule 47 the Society's senior Vice-President do officiate for Col. Sewell.
No. 14. 31-8-31.

Report President's departure from Calcutta on 21-9-31 on his way to Europe, the senior Vice-President's officiating for him from that date. Record.
No. 1. 28-9-31.

Fixing the date of next Council and Committee Meetings. No Council and Committee Meetings during October. The question of holding Council and Committee Meetings during the recess months to be brought up in next Council meeting.
No. 8. 28-9-31.

Fixing dates for the next (December) Council and Committee Meetings. The date to be provisionally fixed for the 21st of December, but the General Secretary to decide finally in consultation with the President if public functions later on render this provisional date unsuitable.
No. 12. 30-11-31.

The question of holding Council and Committee Meetings during the recess months, September and October. (Deferred from the Council Meeting of 28-9-31.) Hold over.
No. 14. 30-11-31.

Finance Committee No. 9 of 25-11-31. Absence of the Honorary Treasurer from Calcutta for the next four months and his resignation of the office. Recommendation: That in case the Honorary Treasurer's resignation be accepted by the Council Mr. James Insch be appointed in his stead as Honorary Treasurer to the Society for the remainder of the year. Unanimously resolved to record the hearty thanks of the Committee to Mr. K. C. Mahindra for his valuable services rendered to the Society as its Honorary Treasurer together with the Committee's best wishes for a happy holiday and safe return to India. Council order: Accept.
No. 17. 30-11-31.

Absence of the Honorary Treasurer from Calcutta. Mr. Mahindra's resignation to be accepted with an expression of the very cordial thanks of the Council to the vacating Honorary Treasurer for the valuable services rendered by him to the Society during his tenure of office. Mr. James Insch to be Honorary Treasurer during the remainder of the Society's year. The General Secretary to officiate as Treasurer until Mr. Insch's assumption of office.
No. 18. 30-11-31.

Informal consideration composition of Council for 1932-33. After discussion the following list of candidates for nomination for next year's Council was placed before the meeting for consideration :—

President	The Hon'ble Mr. Justice C. C. Ghose.
Vice-President ..	Lt.-Col. R. B. S. Sewell.
,, ,, ...	Dr. L. L. Fermor.
,, ,, ...	Sir R. N. Mookerjee.
,, ,, ...	Lt.-Col. R. Knowles.
General Secretary ..	Mr. Johan van Manen.
Treasurer	Mr. James Insch.
Phil. Secretary ..	Mr. C. W. Gurner.
Jt. Phil. Secretary ..	Dr. M. Hidayat Hosain.
Nat. Hist. Secretary (Biology).	Dr. Baini Prashad.
Nat. Hist. Secretary (Phys. Science).	Dr. W. A. Jenkins.
Anthropological Secretary ..	Rev. P. O. Bodding.
Medical Secretary ..	Dr. U. N. Brahmachari.
Library Secretary ..	Dr. B. S. Guha.
Member of Council ..	Sir J. C. Coyajee.
,, ,, ..	Mr. M. Mahfuz-ul Haq.
,, ,, ..	Sir David Ezra.
,, ,, ..	Mr. L. R. Fawcus.
,, ,, ..	Mr. Percy Brown.

Resolved: That the General Secretary do print and circulate to the members of the Council the list of the Council as at present constituted, together with the new list placed before the meeting, and provided with a blank column for additional names; that those lists shall be returned to the General Secretary within a week of date of issue, that a list be compiled of the candidates finally proposed and be placed before the next Council Meeting to be voted upon.
No. 26. 30-11-31.

The question of holding a Special Council Meeting in January, 1932, and fixing the date thereof. Provisionally to be fixed for January 16th.
No. 6. 23-12-31.

Council nomination, 1931-32. The General Secretary reported that 14 Council Members had returned the list of candidates circulated, duly signed and unanimously approved with one single additional suggestion. Resolved: That the list of names placed before the Council in the November Meeting be declared that of the Council candidates for election to next year's Council and that it be ordered to be issued to the Resident Members as prescribed in Rule 44.
No. 14. 23-12-31.

FELLOWS—

Recommendations of the Meeting of Fellows, held on 5-1-31. Propose for election in the Annual Meeting.
No. 12. 26-1-31.

Letter from Mr. T. H. D. La Touche, offering to resign his status as an Ordinary Fellow of the Society. Offer not to be accepted. Suitable letter to be written in reply.
No. 13. 26-1-31.

Letter of thanks from Col. Chopra for his election as an Ordinary Fellow of the Society. Record.
No. 4. 30-3-31.

FINANCE—

Letter, and reply thereto, from the Director of Public Instruction, Bengal, in connection with the three Government Grants for Oriental Publication Works. Record. Reply approved.
No. 2. 26-1-31.

Finance Committee No. 3 (b) of 21-1-31. Report by the Honorary Treasurer of the renewal during the month of a Fixed Deposit with the Central Bank of India for Rs. 10,000 which matured on the 10th January, 1931, for a further period of six months. Recommendation: Approve. Council order: Accept.
No. 14. 26-1-31.

Finance Committee No. 3 (c) of 21-1-31. Report by the Honorary Treasurer of two Fixed Deposits with Central Bank of India Ltd., for Rs. 5,066-10-9 and Rs. 7,500 respectively which mature on the 11th and 13th February, 1931. Recommendation: Treasurer to re-invest at his discretion. Council order: Accept.
No. 14. 26-1-31.

Letter from Dr. U. N. Brahmachari offering to continue defraying the expenses of the light refreshment to members of the Society before the Monthly General Meetings. Accept with thanks.
No. 2. 23-2-31.

Letter from Messrs. Price, Waterhouse, Peat & Co., forwarding certified copies of the Society's balance sheet for 1930, together with a suggestion for the improvement in keeping the accounts of one of the statements. (Circular No. 22.)
Order: Record. Accept suggestion.
No. 4. 23-2-31.

Finance Committee No. 3 (a) of 18-2-31. Report by the Treasurer, purchase of three months' Treasury Bills for Rs. 25,000 face value (I.S.C., Rs. 13,776-14-0—face value Rs. 14,000; A.S.B., Rs. 10,824-11-0—face value Rs. 11,000). Recommendation: Approve. Council order: Accept.
No. 7. 23-2-31.

Finance Committee No. 4 of 25-3-31. Report by the Honorary Treasurer of the renewal during the month with the Central Bank of India Ltd., Calcutta, for a fixed deposit for Rs. 10,215-6-9, with interest, for a further period of one month. Recommendation: Approve. Council order: Accept.
No. 9. 30-3-31.

Finance Committee No. 3 (2) of 22-4-31. Report by the Honorary Treasurer of the renewal during the month of a fixed deposit with the Central Bank of India Ltd., Calcutta, for Rs. 10,328-12-3 for one month more. Recommendation: Approved. Council order: Accept.
No. 6. 27-4-31.

Finance Committee No. 5 of 22-4-31. International Catalogue of Scientific Literature. Recommendation: The Director to be written to for his assistance in providing data which will enable the Society to ascertain its liabilities. The Cashier to be charged with the task of preparing a statement from the documents in the Society's office, as overtime work, for a bonus of Rs. 50 on satisfactory conclusion. Council order: Accept.
No. 6. 27-4-31.

Finance Committee No. 3 of 20-5-31. Report by Honorary Treasurer of a fixed deposit made during the month with the Central Bank of India Ltd., Calcutta, for Rs. 7,500 for a period of three months. Recommendation: Approve. Council order: Accept.
No. 4. 25-5-31.

Finance Committee No. 4 of 20-5-31. Report by the Honorary Treasurer of the renewal during the month with the Central Bank of

India Ltd., Calcutta, of a fixed deposit for Rs. 10,374-0-6 with interest for one month. Recommendation: Approve. Council order: Accept.
No. 4. 25-5-31.

Finance Committee No. 5 of 20-5-31. Investments for minor funds. Recommendation: Invest the following amounts for various funds as specified. Barclay Memorial Fund, 3½% Govt. Paper face value Rs. 100. Servants' Pension Fund, 3½% Govt. Paper face value Rs. 500. Permanent Lib. Endowment Fund, 3½% Rs. 1,000. Annandale Memorial Fund, 3½% Rs. 1,000. Council order: Accept.
No. 4. 25-5-31.

Finance Committee No. 6 of 20-5-31. Further part payment outstandings Baptist Mission Press. Recommendation: Authorize Hon. Treasurer to pay at his discretion during or after the month of June old outstanding debits to the Baptist Mission Press either in whole or in part as funds permit. Council order: Accept.
No. 4. 25-5-31.

Finance Committee No. 4 of 24-6-31. Report payment Baptist Mission Press, Rs. 9,702-6-9. Recommendation: Record. Council order: Accept.
No. 9. 29-6-31.

Finance Committee No. 4 (1) of 22-7-31. Honorary Treasurer's report of the renewal during the month of a fixed deposit with the Central Bank of India for Rs. 10,455-1 for a period of three months. Recommendation: Approved. Council order: Accept.
No. 5. 27-7-31.

Finance Committee No. 4 (2) of 22-7-31. Honorary Treasurer's report of a new fixed deposit made with the Central Bank of India for Rs. 12,000 for a period of two months. Recommendation: Approved. Council order: Accept.
No. 5. 27-7-31.

Finance Committee No. 4 (4) of 22-7-31. Statement of accounts of the International Catalogue of Scientific Literature in account with the Asiatic Society of Bengal. Recommendation: That the Honorary Treasurer be requested kindly to report to next meeting of the Finance Committee if possible. Council order: Accept.
No. 5. 27-7-31.

Finance Committee No. 5 of 22-7-31. Express letter from the Government of India, Department of Education, Health and Lands, dated 14-7-31, forwarding a questionnaire from the Retrenchment Advisory Committee. Resolved that the Honorary Treasurer be requested to submit any suggestions to next Council. Council order: Accept.
No. 5. 27-7-31.

Letter from the Government of India, Department of Education, Health and Lands, asking information concerning the Society's finances in connection with the Retrenchment Advisory Committee. Preliminary draft reply approved. A Committee consisting of President, Secretary, and Treasurer to prepare final documents and to forward these as early as possible to Government in the name and on behalf of the Council of the Asiatic Society of Bengal.
No. 11. 27-7-31.

Copy of the reply and memoranda submitted to the Government of India regarding the retrenchment of the Government Grant-in-aid to the Society. Approved.
No. 5. 31-8-31.

Report by the Honorary Treasurer concerning the International Catalogue of Scientific Literature. The thanks of the Council to be expressed to the Honorary Treasurer for his painstaking labours. The Director of the Catalogue to be replied to on the basis of the report on receipt of his next communication.
No. 7. 31-8-31.

Finance Committee No. 3 of 26-8-31. (*a*) Report by the Honorary Treasurer of the renewal during the month of a fixed deposit with the Central Bank of India Ltd., Calcutta, for Rs. 7,500 with accrued interest for a further period of three months. (*b*) Report by the Honorary Treasurer, of a fresh fixed deposit made with the Central Bank of India Ltd., Calcutta, for Rs. 4,000 for a period of one month. (*c*) Report by the Honorary Treasurer of the purchase during the current month of a Government Treasury Bill for Rs. 25,000 jointly for account of the Society Rs. 11,000 and of the Indian Science Congress Rs. 14,000. (*d*) Report by the Honorary Treasurer of the purchase of Rs. 2,600 Face Value of 3½% G.P. Notes for various Fund Accounts of the Society. Recommendation: Approve. Council order: Accept.
No. 9. 31-8-31.

Further correspondence with the Government of India, Department of Education, Health and Lands, regarding retrenchment of the Society's Grant. Record and accept the suggestion of the Finance Committee of 23-9-31 that a further letter be addressed to the Government drawing attention to the aspect of commitments.
No. 4. 28-9-31.

Finance Committee No. 3 (a) of 23-9-31. Report by the Honorary Treasurer of the renewal during the month of a fixed deposit with the Central Bank of India Ltd., Calcutta, for Rs. 12,000 with interest for a further period of one month. Recommendation: Approve. Council order: Accept.
No. 10. 28-9-31.

Finance Committee No. 3 (b) of 23-9-31. Safe custody endorsement of G.P. Notes, to the Face Value of Rs. 2,600. Recommendation: That the following resolution be recommended to Council for adoption. 'The Council authorizes the (Honorary) Treasurer to formally endorse in favour of the Imperial Bank of India, Government and/or other Trustee Securities belonging to the Society and kept in safe custody of the Imperial Bank of India for the purpose of facilitating collection of interest.' Council order: Accept, including the recommendation to authorize the Honorary Treasurer to endorse securities to the Imperial Bank of India.
No. 10. 28-9-31.

Finance Committee No. 4 (a) of 25-11-31. Report by the Honorary Treasurer of the purchase of 3 months Government Treasury Bill for Rs. 25,000 for the Society, during the month. Recommendation: Record. Council order: Accept.
No. 17. 30-11-31.

Finance Committee No. 4 (b) of 25-11-31. Report by the Honorary Treasurer of a fixed deposit for Rs. 6,000 made during the month with

the Central Bank of India Ltd., Calcutta, for a period of one month. Recommendation : Approve. Council order : Accept.
No. 17. 30-11-31.

Finance Committee No. 4 (c) of 25-11-31. Statement of receipt and expenditure of the Society for the ten months ending with 31st October, 1931, as compared to the budget estimate for the year. Recommendation : Record. Council order : Accept.
No. 17. 30-11-31.

Finance Committee No. 7 of 25-11-31. Catalogue of scientific serial publications, Calcutta Fund. Recommendation : That the fund be closed and its balance be transferred to the Publication Fund of the Society. Council Order : Accept.
No. 17. 30-11-31.

Report progress Building Repairs. Report noted. Unsafe rafters to be replaced by steel girders wherever necessary. Total cost to be met from Rs. 4,000 standing to the credit of the Building Repair Fund Account, balance from the assets in the Building Fund Account. The 1932 budget allowance of Rs. 2,000 for the Building Repair Fund not to be used for these payments.
No. 3. 23-12-31.

Finance Committee No. 4 (1) of 16-12-31. Society's contribution to the Building Repair Fund Account as per estimate. Recommendation : That the new budget for 1932 include a sum of Rs. 2,000 under this head, not to be spent on the current repairs. That the present repairs be paid for from Rs. 4,000 accumulated in the Building Repair Fund Account during 1930 and 1931 and that in view of the present exceptional financial condition the balance due be drawn from the balance standing to the credit of the Building Fund Account. Council order : Accept.
No. 9. 23-12-31.

Finance Committee No. 4 (2) of 16-12-31. Society's contribution to the Staff Provident Fund Account of Rs. 655-5 for the year 1931, *vide* Pay Order dated December 31. Recommendation : Pay. Council order : Accept.
No. 9. 23-12-31.

Finance Committee No. 4 (3) of 16-12-31. Statement of subscriptions written off during the year 1931. Recommendation : Write off. Council order : Accept.
No. 9. 23-12-31.

Finance Committee No. 4 (4) of 16-12-31. Increment of Salaries. Recommendation : That in view of the present exceptional financial condition the budget for 1932 do not include any increment in staff salaries, but that no cut be made in present staff salaries. Council order : Accept.
No. 9. 23-12-31.

Finance Committee No. 4 (5) of 16-12-31. Budget for the year 1932. Recommendation : That as early as possible a special meeting of the Finance Committee be convened and that the Council may give general directions in view of the present financial condition.

Council order : Accept. Further resolved that in framing the budget for 1932 an amount up to Rs. 5,000 be deflected from the sum lately set aside annually for increase of the permanent endowment fund, to meet any deficit owing to estimated reduced income under various heads due to present abnormal financial condition. Also resolved that

the Honorary Treasurer be authorized to make payments before the end of the financial year of outstanding dues even if exceeding Rs. 100.
No. 9. 23-12-31.

FURNITURE—

Finance Committee No. 4 of 23-9-31. Office Furniture. Recommendation: That the General Secretary be authorized to spend the available balance under this budget head on the purchase of folding chairs and office tables. Council order. Accept.
No. 10. 28-9-31.

GRANTS—

Letter, and reply thereto, from the Director of Public Instruction, Bengal, in connection with the three Government Grants for Oriental Publication Works. Record. Reply approved.
No. 9. 26-1-31.

Copy of the reply and memoranda submitted to the Government of India regarding the retrenchment of the Government Grant-in-aid to the Society. Approved.
No. 5. 31-8-31.

Letter from the Government of Bengal, Office of the Director of Public Instruction, regarding the anthropological and publication grants. The General Secretary to send a reply on behalf of the Council on the basis of previous replies to similar letters from the Government of India.
No. 16. 30-11-31.

Further correspondence with the Government of India, Department of Education, Health and Lands, regarding retrenchment of the Society's Grant. Record and accept the suggestion of the Finance Committee of 23-9-31 that a further letter be addressed to the Government drawing attention to the aspect of commitments.
No. 4. 28-9-31.

Finance Committee No. 8 of 25-11-31. Letter from the Government of Bengal, Office of the Director of Public Instruction, dated 25-11-1931, enquiring into the possibility of the suspension or reduction of two grants to the Society of Rs. 3,600 and Rs. 2,000 annually. Recommendation: That the General Secretary draft a reply on the basis of a previous reply to the Government of India on a similar subject and to take into account the special circumstances under reference. Council order: Accept.
No. 17. 30-11-31.

Letter from the Government of Bengal, Education Department, intimating reduction in the grants to the Society. Record. A deputation consisting of President, Honorary Treasurer, and General Secretary if possible to arrange for an interview with the Secretary to the Government of Bengal (Education) to attempt to obtain a reduction of the cut.
No. 8. 23-12-31.

HONORARY FELLOWS—

Proposal from the President for the election of Sir Jivanji Jamshedji Modi as an Honorary Fellow of the Society. Cordially approved. Resolved to recommend Sir Jivanji Jamshedji Modi for election under terms of Rule 13.
No. 10. 26-1-31.

सन्दर्भ ग्रन्थ
REFRENCE BOOK

Letter of thanks from Sir Jivanji Jamshedji Modi for his election as an Honorary Fellow of the Society. Record.
No. 1. 30-3-31.

HONOURS—

Members of the Society in the King Emperor's Birthday Honours List. Record.
No. 1. 29-6-31.

INDIAN SCIENCE CONGRESS—

Letter of thanks from the 18th Indian Science Congress, Nagpur. Record.
No. 3. 26-1-31.

Finance Committee No. 3 (a) of 18-2-31. Report by the Treasurer, purchase of three months' Treasury Bills for Rs. 25,000 face value (I.S.C., Rs. 13,776-14-0—face value Rs. 14,000; A.S.B., Rs. 10,824-11-0—face value Rs. 11,000). Recommendation: Approve. Council order: Accept.
No. 7. 23-2-31.

Report reprint Proceedings of the Fifth Indian Science Congress. Record, and sanction reprint of the Third Proceedings.
No. 5. 29-6-31.

Report issue of the Proceedings of the 18th Indian Science Congress. Record.
No. 3. 30-11-31.

INSTITUTIONAL MEMBERSHIP—

Report receipt of application for Institutional Membership from the Benares Hindu University Library, Benares. Accept and announce in Monthly Meeting.
No. 12. 27-4-31.

Report receipt of application for Institutional Membership from the Otani University Library, Kyoto, Japan. Accept and announce in next General Meeting.
No. 2. 25-5-31.

INVITATIONS—

Invitation to H.E. the Governor of Bengal to preside over the Society's Annual Meeting, February, 1932. The General Secretary to issue a letter of cordial invitation.
No. 13. 30-11-31.

KAMALA LECTURESHIP—

Representation on the Selection Committee, Kamala Lectureship, Calcutta University. The Society's representative to be MM. H. P. Shastri.
No. 5. 30-3-31.

LECTURES—

Report by the General Secretary concerning the general lectures for the season. Arrangements approved.
No. 22. 26-1-31.

सन्दर्भ ग्रन्थ
REFRENCE BOOK

Public Lectures, Winter Session, 1931-32. Invite Mr. R. Senior White. Lecture series to be arranged during next December and January.
No. 4. 27-7-31.

Proposed General Lecture by Dr. Magnus Hirschfeld. Approved.
No. 3. 28-9-31.

Public Lecture on Indian Music by Mrs. Baini Chatterji. Accept offer. General Secretary to arrange.
No. 27. 30-11-31.

General Lectures. Resolved that an offer, verbally made by Mr. Ph. C. Visser, to give a lecture illustrated by lantern slides on 'The unknown Karakorum mountains and Chinese Turkistan' be gratefully accepted.
No. 16. 23-12-31.

LIBRARY—

Non-return of Books and Manuscripts taken on loan by certain members of the Society. In the first instance the delinquent borrowers to be communicated with by telephone or registered letter (without imprint on envelope) with acknowledgment-of-receipt-form.
No. 4. 27-4-31.

Recommendations of the Library Committee. Accept. Draft of recall letter, overdue books outstanding, approved.
No. 5. 25-5-31.

Library Committee No. 3 of 29-6-31. Report presentation by the Government of Siam of a copy of the new Siamese edition of the Tripitaka and another Buddhist work. Recommendation : Letter of thanks to donor. Council order : Accept.
No. 10. 29-6-31.

Library Committee No. 1 of 29-6-31. Report concerning outstanding books. Recommendation : Drastic letter to be sent to defaulters. Council order : Accept.
No. 10. 29-6-31.

LOAN OF MANUSCRIPTS—

Application by Mr. P. C. Sen for the loan of a MS. of the Panchatrakaha. MS. not to be issued out of the Library, but to be placed at applicant's disposal in the Library.
No. 13. 27-4-31.

Letter from the Bhandarkar Oriental Research Institute asking for the loan of a brittle MS. Decline.
No. 29. 30-11-31.

MANUSCRIPTS—

Letter from N. K. Bhattasali, Dacca, making suggestion concerning the collection of Sk. Manuscripts. Write to enquire from the Dacca University concerning the present position of the search for MSS. by the University, and ask for further particulars from Mr. Bhattasali calling for a copy of the preliminary notice of the Dacca University collection alluded in the letter.
No. 12. 23-2-31.

Presentation of a MS. copy of the Arabic Version of Euclid by Mr. James Insch. Cordial thanks to the donor.
No. 14. 29-6-31.

MEETING—

The question of holding an Ordinary Monthly Meeting in January, 1932. No meeting in January on account of repairs to the Society's building.
No. 12. 23-12-31.

MEMBERSHIP—

List of members in arrears with subscriptions for four or more quarters under Rules 22 and 37. Several names were put up. Apply Rules.
No. 18 (*a*). 26-1-31.

Removal of names under Rules 37 and 38. 10 names were put up. Remove and announce in General Meeting.
No. 11. 23-2-31.

Non-return of Books and Manuscripts taken on loan by certain members of the Society. In the first instance the delinquent borrowers to be communicated with by telephone or registered letter (without imprint on envelope) with acknowledgment-of-receipt-form.
No. 4. 27-4-31.

Finance Committee No. 3 (1) of 22-4-31. List of members in arrears of subscription for four or more quarters. Recommendation: Apply rules, with the exception of the cases of Messrs. Jenkins, P. N. Tagore and such others as the General Secretary may select to whom personal letters should be written in the first instance. Council order: Accept. Draft letter to Members in arrears with subscriptions approved.
No. 6. 27-4-31.

Removal of names under Rule 40. 6 names put up. Apply Rules and announce.
No. 10. 27-4-31.

List of members in arrears with subscriptions:—List No. 1:—18 names; List No. 2:—6 names; List No. 3:—11 names. Accept recommendation Finance Committee.
No. 11. 27-4-31.

Library Committee No. 1 of 29-6-31. Report concerning outstanding books. Recommendation: Drastic letter to be sent to defaulters. Council order: Accept.
No. 1. 29-6-31.

List of members in arrears with subscriptions for four or more quarters:—List No. 1:—26 names. List of members who are in arrears for eight or more quarters:—List No. 2:—4 names. Apply Rules.
No. 9. 27-7-31.

Report of the death of three of the older members of the Society. Announce.
No. 4. 31-8-31.

List of members in arrears with subscriptions for four or more quarters. Apply Rules.
No. 23. 30-11-31.

Removal of names under Rule 38. Apply Rules.
No. 24. 30-11-31.

Removal of names under Rules 37 and 38. 12 names were put up. Remove Nos. 11–13 and 15–21, and announce in next Monthly Meeting. Hold over Nos. 14 and 22.
No. 15. 23-12-31.

MEMORIAL MEDALS—

Finance Committee No. 5 of 20-5-31. Investments for minor funds. Recommendation: Invest the following amounts for various funds as specified. Barclay Memorial Fund 3½% Govt. Paper face value Rs. 100, Servants' Pension Fund 3½% Govt. Paper Face Value Rs. 500, Permanent Lib. Endowment Fund 3½% Rs. 1,000, Annandale Memorial Fund 3½% Rs. 1,000. Council order: Accept.
No. 4. 25-5-31.

Letter of thanks from Dr. S. W. Kemp for the award to him of the Barclay Memorial Medal. Record.
No. 2. 31-8-31.

Framing of Regulations for the award of the Brühl Memorial Medal. Proposed Regulations: Regulations regarding the award of the Paul Johannes Brühl Memorial Medal. (*See under* RULES AND REGULATIONS.)
Order: Accept regulations as proposed. The usual preamble to be added. Arrangements for the making of the die approved.
No. 6. 28-9-31.

Appointment of Advisory Boards for :—(*a*) Barclay Memorial Medal, (*b*) Paul Johannes Brühl Memorial Medal. The President and the General Secretary together with the *ex-officio* members prescribed by the Regulations to constitute the Boards with power to co-opt further members.
No. 14. 28-9-31.

Matters relating to the 'Paul Johannes Brühl Memorial' Medal. Refer to Sir C. C. Ghose for favour of an opinion.
No. 7. 23-12-31.

MISCELLANEOUS—

Reply from the Government of India, Department of Education, Health and Lands, to the memorial sent by the Society for a grant-in-aid on behalf of Mrs. Stan Harding. Record. Copy to be forwarded to Mrs. Stan Harding.
No. 8. 26-1-31.

Letter from the Secretary to the Government of Bengal, Education Department, asking for Mr. Ivanow's record for transmission to Nizam's Government. A reply to be sent as follows :—

(1) Mr. Ivanow's record of work performed to be given.
(2) Statement that academical qualifications and zeal have been fully satisfactory.
(3) Statement that the Society has found him an extremely difficult man to deal with.
(4) Statement that, if further information be required it may be applied for direct from the Society.

No. 13. 30-3-31.

Finance Committee No. 5 of 22-4-31. International Catalogue of Scientific Literature. Recommendation: The Director to be written to for his assistance in providing data which will enable the Society to ascertain its liabilities. The Cashier to be charged with the task of preparing a statement from the documents in the Society's office, as overtime work, for a bonus of Rs. 50 on satisfactory conclusion. Council order: Accept.
No. 6. 27-4-31.

Finance Committee No. 4 (4) of 22-7-31. Statement of accounts of the International Catalogue of Scientific Literature in account with the Asiatic Society of Bengal. Recommendation : That the Honorary Treasurer be requested kindly to report to next meeting of the Finance Committee if possible. Council order : Accept.
No. 5. 27-7-31.

Finance Committee No. 5 of 22-7-31. Express letter from the Government of India, Department of Education, Health and Lands, dated 14-7-31, forwarding a questionnaire from the Retrenchment Advisory Committee. Resolved that the Honorary Treasurer be requested to submit any suggestions to next Council. Council order : Accept.
No. 5. 27-7-31.

Announcement by the Government of India regarding the proposed retrenchment to be effected in the Scientific and Educational Departments. A Committee consisting of President, Secretary, and Treasurer to consider the matter and to take such action as may be judged desirable and prove feasible.
No. 10. 27-7-31.

Letter from the Government of India, Department of Education, Health and Lands, asking information concerning the Society's finances in connection with the Retrenchment Advisory Committee. Preliminary draft reply approved. A Committee consisting of President, Secretary, and Treasurer to prepare final documents and to forward these as early as possible to Government in the name and on behalf of the Council of the Asiatic Society of Bengal.
No. 11. 27-7-31.

Letter concerning an appeal for funds for flood relief from Sir D. P. Sarbadhikari. No action. Sir D. P. Sarbadhikary to be written to conveying the decision.
No. 6. 31-8-31.

Report by the Honorary Treasurer concerning the International Catalogue of Scientific Literature. The thanks of the Council to be expressed to the Honorary Treasurer for his painstaking labours. The Director of the Catalogue to be replied to on the basis of the report on receipt of his next communication.
No. 7. 31-8-31.

Letter from Dr. Brahmachari regarding his discovery of the omission of an early President of the Society in the Society's succession list of Presidents. Record with thanks.
No. 2. 28-9-31.

Finance Committee No. 3 (c) of 23-9-31. Question in connection with the retrenchment activities of the Government. Recommendation : That a further letter be addressed to the Government drawing attention to the aspect of commitments. Council order : Accept.
No. 10. 28-9-31.

Letter from the Government of India, Political Department, requesting the Society's views regarding a proposed Bill to amend the Ancient Monuments Preservation Act of 1904 (Circular No. 106), and reply thereto. Reply approved.
No. 15. 30-11-31.

PATRONS—

Patronship of Lord Willingdon, the new Viceroy. General Secretary to address the Private Secretary in the usual terms conveying the Society's request to H.E. to accept the Office of Patron to the Society.
No. 10. 25-5-31.

Letter from the Military Secretary to H.E. the Viceroy intimating acceptance by H.E. of the Patronship of the Society. Record.
No. 1. 31-8-31.

Report of the General Secretary's interview with H.E. the Viceroy. Record.
No. 2. 23-12-31.

PRESENTATIONS—

Presentation to the Society of a copy of Memoirs, Indian Medical Research, by its author, Lt.-Col. R. Knowles. The Council's thanks to be conveyed to Lt.-Col. Knowles, and the Council's congratulations to the author.
No. 5. 26-1-31.

Presentation to the Society by Mr. James Insch of the New English Dictionary, twelve volumes. On proposal of Sir C. C. Ghose a hearty vote of thanks to be communicated to the generous donor.
No. 14. 30-3-31.

Library Committee No. 3 of 29-6-31. Report presentation by the Government of Siam of a copy of the new Siamese edition of the Tripitaka and another Buddhist work. Recommendation : Letter of thanks to donor. Council order : Accept.
No. 10. 29-6-31.

Report regarding presentation of the Society at the forthcoming centenary celebration of the British Association for the Advancement of Science in London. Record. The Council's thanks to be conveyed to the Members of the Committee.
No. 2. 27-7-31.

Letters from Dr. U. N. Brahmachari offering to the Society a series of photographic reproductions of the Society's past Presidents. Proposed by Sir C. C. Ghose and unanimously resolved that the gift be accepted ; that the Council's grateful thanks be conveyed to the donor, and that the photographs be suitably hanged in the Society's building after consultation with Mr. Percy Brown.
No. 7. 30-11-31.

Presentation to the Society of a Russian Dictionary. Circulate.
No. 5. 23-12-31.

PUBLICATIONS—

Publication Committee No. 1 of 28-9-31. Report absence of new papers. Recommendation : Record. Council order : Accept.
No. 12. 28-9-31.

Report issue of the Proceedings of the 18th Indian Science Congress. Record.
No. 3. 30-11-31.

Arrangements to finish the Kavya Volume of the Catalogue of Sanskrit MSS. of H. P. Shastri. The General Secretary to make suitable arrangements.
No. 30. 30-11-31.

Letter from Mr. Harit Krishna Deb suggesting that the Society should undertake the publication of the Garga-Samhita and intimating his willingness to undertake the task of editing at once. Circulate to Council.
No. 31. 30-11-31.

Letter from Mr. L. Bogdanov enquiring whether the Society is willing to publish his critical edition and English translation of the Sufi manual, the Mirsad of Razi. Circulate to Council.
No. 32. 30-11-31.

PROVIDENT FUND—

Finance Committee No. 4 of 22-4-31. Petition from Maulavi Shah Moinuddin Ahmad (18 years' service) for a loan of Rs. 600 from the Provident Fund to enable him to meet expenses connected with the marriage of his only unmarried daughter. Recommendation: Grant loan from the Provident Fund to an amount of Rs. 360 at an interest of @ 4%. Balance of Rs. 240 to be granted as a loan from the funds of the Society, free of interest, against security of the borrower's share in the Provident Fund. Payment by monthly instalments of Rs. 20. Council order: Accept.
No. 6. 27-4-31.

Finance Committee No. 5 of 25-11-31. Application from S. K. Roy, for a loan of Rs. 150 from the Society's Provident Fund. Recommendation: Grant. Council order: Accept.
No. 17. 30-11-31.

Finance Committee No. 4 (2) of 16-12-31. Society's contribution to the Staff Provident Fund Account of Rs. 655-5 for the year 1931, *vide* Pay Order, dated Dec. 31. Recommendation: Pay. Council order: Accept.
No. 9. 23-12-31.

REPRESENTATION—

Representation Centenary Meeting British Association for the Advancement of Science. Arrangements approved.
No. 18. 27-4-31.

Invitation to send delegates to represent the Society from the All-India Hindi Literary Conference, Calcutta, May, 1931. General Secretary to write a suitable reply.
No. 1. 25-5-31.

REQUESTS—

Request from the Mining and Geological Institute of India for the use of the Society's Hall for their Annual Meeting. Approved.
No. 6. 26-1-31.

Request to the Surveyor-General of India for free supply of a representative set of maps of India to the Society. Official request to be addressed to the Surveyor-General for the free supply of maps of importance or interest to the Society. A proper cabinet to be obtained for the preservation of the maps.
No. 7. 26-1-31.

Request from the Panjab University to be permitted to reprint certain portion of an Arabic work by Tabrizi published in the Bibliotheca Indica. Grant. Usual acknowledgment to be made.
No. 3. 27-4-31.

Request for the use of the Society's Hall by the Mining and Geological Institute of India. Action approved.
No. 6. 29-6-31.

RULES AND REGULATIONS—

Framing of Regulations for the award of the Brühl Memorial Medal. Proposed Regulations: Regulations regarding the award of the Paul Johannes Brühl Memorial Medal.

The following are the regulations for the award of the medal :—

(1) The medal shall be awarded every three years at the Ordinary Annual Meeting of the Asiatic Society of Bengal, in February.

(2) The medal shall be bestowed on a person who, in the opinion of the Council, has made conspicuously important contributions to the knowledge of Asiatic Botany.

(3) The Council shall, at a meeting preceding the Ordinary Monthly Meeting in November, appoint an Advisory Board consisting of not less than three members.

(4) The Advisory Board shall be termed 'The Paul Johannes Brühl Memorial Medal Advisory Board' and shall include the Biological Secretary. The Board shall appoint a Chairman from amongst its members who shall have a casting vote (in addition to his own vote) in the event of the number of votes being equally divided.

(5) The General Secretary shall call a meeting of the Advisory Board on the first convenient date subsequent to the first Monday of December, at the same time requesting members to bring with them to the meeting detailed statements of the work or attainments of such candidates as they may wish to propose. The General Secretary shall also place before the Board for consideration detailed statements of the work or attainments of any other candidate submitted by any Fellow of the Society. The Board for the selection of a name to be submitted to the Council at its December Meeting.

(6) Notwithstanding anything determined in these Regulations it shall be within the competence of the Board to abstain from the selection of any name to be submitted for the year and to report accordingly to the Council, in which case, provided the Council concurs, the award for the year shall lapse.

Order: Accept regulations as proposed. The usual preamble to be added. Arrangements for the making of the die approved.
No. 6. 28-9-31.

STAFF—

Matters relating to Mr. Ivanow. The Council, having considered the letter addressed to it by Mr. Ivanow bearing the date of 5th January, 1931, resolves that it cannot entertain this or any other proposal for employing him in any capacity. Further resolved: that a copy of this resolution, together with an intimation that it was passed unanimously, be communicated to Mr. Ivanow in reply to his letter.
No. 21. 26-1-31.

Finance Committee No. 4 of 22-4-31. Petition from Maulavi Shah Moinuddin Ahmad (18 years' service) for a loan of Rs. 600 from the Provident Fund to enable him to meet expenses connected with the marriage of his only unmarried daughter. Recommendation: Grant loan from the Provident Fund to an amount of Rs. 360 at an interest of @ 4%. Balance of Rs. 240 to be granted as a loan from the funds

of the Society, free of interest, against security of the borrower's share in the Provident Fund. Payment by monthly instalments of Rs. 20. Council order: Accept.
No. 6. 27-4-31.

Revision Staff. Services of N. K. Biswas, Assistant Library Clerk, and H. B. Banerjee, File Clerk, to be terminated with effect from the end of April, with payment of one month's salary in lieu of notice.
No. 15. 27-4-31.

Finance Committee No. 7 of 20-5-31. Appointment Stenographer. Recommendation: Appoint a stenographer on one month's trial at a maximum salary of Rs. 150. General Secretary to report results to next Council Meeting. Council order: Accept.
No. 4. 25-5-31.

Letter from Mr. Ivanow to the Council dated Bombay, 19-5-31. Duplicate of letter No. 362 of 9-2-31 to be sent to Mr. Ivanow under registered cover.
No. 8. 25-5-31.

Finance Committee No. 6 of 25-11-31. Petition from Jamadar, Ujagir Chaube, for two months' leave on full pay. Recommendation: That the request cannot be granted under the rules but that sick leave rules may be applied and that the applicant may, at the discretion of the General Secretary, have the benefit of such savings as acting arrangements have caused. Council order: Accept.
No. 17. 30-11-31.

Finance Committee No. 4 (4) of 16-12-31. Increment of Salaries. Recommendation: That in view of the present exceptional financial condition the budget for 1932 do not include any increment in staff salaries, but that no cut be made in present staff salaries. Council order: Accept.
No. 9. 23-12-31.

TAXES—

Letter from Col. Barwell making certain suggestions in connection with the Municipal taxation. Sir C. C. Ghose and Mr. K. C. De to be invited to use, conjointly with the President and General Secretary, their good offices to approach the Members of the Corporation concerning these matters more or less informally in the first instance.
No. 7. 30-3-31.

Report General Secretary enhancement Municipal taxes on plot No. 1-1, Park Street. Record. Mr. B. B. Ghose to be notified of date of hearing of the case and to be supplied with facts of the case.
No. 14. 27-4-31.

Report Municipal re-assessment taxes regarding 1-1, Park Street. Thanks to Mr. C. C. Biswas in writing; verbal thanks to Mr. B. B. Ghose.
No. 13. 29-6-31.

VISITS—

Report visit to the Society of Mr. R. Littlehailes, Educational Commissioner with the Government of India, on 2-10-31. Record.
No. 1. 30-11-31.

List of
Patrons,
Officers, Council Members, Members, Fellows, and Medallists
# of the
Asiatic Society of Bengal,
On the 31st December, 1931.

PATRONS OF THE ASIATIC SOCIETY OF BENGAL.

1931	**H.E. the Earl of Willingdon, G.M.S.I., G.C.M.G., G.M.I.E., G.B.E., Viceroy and Governor-General of India.**
1927	**H.E. Colonel Sir Francis Stanley Jackson, P.C., G.C.I.E., Governor of Bengal.**

1910–1916	Lord Hardinge of Penshurst, K.G., P.C., G.C.B., G.C.M.G., G.C.S.I., G.C.I.E., K.C.M.G., G.C.V.O., K.C.V.O., C.B., C.V.O., I.S.O.
1916–1921	Lord Chelmsford, P.C., K.C.M.G., G.C.M.G., G.C.S.I., G.C.I.E., G.B.E.
1917–1922	Marquess of Zetland, P.C., G.C.S.I., G.C.I.E.
1921–1926	Earl of Reading, G.C.B., P.C., G.C.V.O., K.C.V.O., G.B.E.
1922–1927	Earl of Lytton, P.C., G.C.I.E.
1926–1931	Baron Irwin, of Kirby under Dale, G.M.S.I., G.M.I.E.

OFFICERS AND MEMBERS OF COUNCIL OF THE ASIATIC SOCIETY OF BENGAL DURING THE YEAR 1931.

Elections Annual Meeting.

President.

Lt.-Col. R. B. Seymour Sewell, M.A., M.R.C.S., L.R.C.P., Sc.D. (Cantab.), F.L.S., F.Z.S., I.M.S., F.A.S.B.

Vice-Presidents.

Rai Upendra Nath Brahmachari, Bahadur, M.A., M.D., Ph.D., F.A.S.B.
L. L. Fermor, Esq., O.B.E., D.Sc., A.R.S.M., F.G.S., M.Inst.M.M., F.A.S.B.
Sir R. N. Mookerjee, K.C.I.E., K.C.V.O.
The Hon'ble Mr. Justice C. C. Ghose, Kt., Barrister-at-Law.

Secretaries and Treasurer.

General Secretary :—Johan van Manen, Esq., C.I.E., F.A.S.B.
Treasurer :—K. C. Mahindra, Esq., B.A. (Cantab.).
Philological Secretary :—Mahamahopadhyaya Haraprasad Shastri, C.I.E., M.A., D.Litt., F.A.S.B.
Joint Philological Secretary :—Shamsu'l 'Ulama Mawlawi M. Hidayat Hosain, Khan Bahadur, Ph.D., F.A.S.B.
Natural History Secretaries. { Biology :—S. L. Hora, Esq., D.Sc. (Punjab), D.Sc. (Edinburgh), F.R.S.E., F.A.S.B.
Physical Science :—W. A. Jenkins, Esq., D.Sc. (Sheffield), I.E.S.
Anthropological Secretary :—The Rev. P. O. Bodding, M.A., F.A.S.B.
Medical Secretary :—Lt.-Col. R. Knowles, B.A. (Cantab.), M.R.C.S., L.R.C.P., I.M.S., F.A.S.B.
Library Secretary :—B. S. Guha, Esq., M.A., Ph.D. (Harvard).

Other Members of Council.

The Hon'ble Mr. B. B. Ghose, M.A., B.L.
Sir J. C. Coyajee, Kt., B.A. (Cantab.), LL.B., I.E.S.
Jas. Insch, Esq.
K. C. De, Esq., C.I.E., B.A., I.C.S. (retired).
M. Mahfuz-ul Haq, Esq., M.A.

APPOINTMENTS, TRANSFERS, ETC., DURING THE YEAR

Col. Sewell, absent from India from 19th September, 1931 for the remainder of the year and Dr. Brahmachari officiated for him during his absence.
Mr. Mahindra was absent from 26th May, 1931 and the General Secretary officiated for him during his absence.
Mr. Mahindra, resigned on 28th November, 1931 and was replaced by Mr. James Insch.
MM. H. P. Shastri died on 17th November, 1931.
Hon. Mr. B. B. Ghose, resigned on 26th November, 1931.
Col. Sewell, absent from 17th February, 1931 to 8th March, 1931.
Dr. Guha, absent for three months, January–March.
Dr. Hora, absent from April for the remainder of the year.
Dr. Fermor, absent for four months, April–August.
Prof. Haq, absent, from 28th April, 1931 to 1st July, 1931 and 14th October, 1931 to 20th November, 1931.
Col. Knowles, absent from 7th May, 1931 to 6th November, 1931.
Mr. K. C. De, absent from 20th April, 1931 to 18th December, 1931.
Sir C. C. Ghose, absent from 18th May, 1931 to 1st June, 1931.
Sir R. N. Mookerjee, absent from 15th May, 1931 to 16th June, 1931.
Dr. Jenkins, absent from July for the remainder of the year.
Sir J. C. Coyajee, absent from 6th August, 1931 to 15th October, 1931.
Hon. Mr. B. B. Ghose, absent from 20th September, 1931 to 1st November, 1931.
Mr. Van Manen, absent from 27th October, 1931 to 4th November, 1931.

OFFICERS AND MEMBERS OF COUNCIL OF THE ASIATIC SOCIETY OF BENGAL ELECTED FOR THE YEAR 1932.

President

The Hon'ble Mr. Justice C. C. Ghose, Kt., Barrister-at-Law.

Vice-Presidents.

Lt.-Col. R. B. Seymour Sewell, M.A., M.R.C.S., L.R.C.P., Sc.D. (Cantab.), F.L.S., F.Z.S., I.M.S., F.A.S.B.
L. L. Fermor, Esq., O.B.E., D.Sc., A.R.S.M., F.G.S., M.Inst.M.M., F.A.S.B.
Sir R. N. Mookerjee, K.C.I.E., K.C.V.O., Hon. F.A.S.B.
Lt.-Col. R. Knowles, B.A. (Cantab.), M.R.C.S., L.R.C.P., I.M.S., F.A.S.B.

Secretaries and Treasurer.

General Secretary :—Johan van Manen, Esq., C.I.E., F.A.S.B.
Treasurer :—Jas. Insch, Esq.
Philological Secretary :—C. W. Gurner, Esq., B.A. (Oxon.), I.C.S.
Joint Philological Secretary :—Shamsu'l 'Ulama Mawlawi M. Hidayat Hosain, Khan Bahadur, Ph.D., F.A.S.B.
Natural History Secretaries. { Biology :—Baini Prashad, Esq., D.Sc., F.Z.S., F.R.S.E., F.A.S.B.
Physical Science :—W. A. Jenkins, Esq., D.Sc. (Sheffield), I.E.S.
Anthropological Secretary :—The Rev. P. O. Bodding, M.A., F.A.S.B.
Medical Secretary :—Rai Upendra Nath Brahmachari, Bahadur, M.A., M.D., Ph.D., F.A.S.B.
Library Secretary :—B. S. Guha, Esq., M.A., Ph.D. (Harvard).

Other Members of Council.

Sir J. C. Coyajee, Kt., B.A. (Cantab.), LL.B., I.E.S.
M. Mahfuz-ul Haq, Esq., M.A.
Sir David Ezra, Kt., F.Z.S., M.B.O.U.
L. R. Fawcus, Esq., B.A. (Cantab.), I.C.S.
Percy Brown, Esq., A.R.C.A.

ORDINARY MEMBERS.

R=Resident. N=Non-Resident. F=Foreign. A=Absent. L=Life.

An Asterisk is prefixed to names of Ordinary Fellows of the Society.

Date of Election.		
6-5-25	R	**Abbasi,** Mohammad Amin, *Maulavi, Assistant Superintendent.* Hooghli Madrassah, Hooghli.
5-4-22	R	**Abdul Ali,** Abul Faiz Muhammad, M.A., M.R.A.S., F.R.S.L., F.R.G.S., F.R.H.S. 3, Turner Street, Calcutta.
7-3-27	R	**Abdul Kadir,** A. F. M., M.A. (Allahabad), Maulvie Fazil (Punjab), Madrassah Final (Calcutta), *Professor, Islamia College.* Wellesley Street, Calcutta.
2-11-25	N	**Acharya,** Paramananda, B.Sc., *Archæological Scholar.* Mayurbhanj State, Baripada.
2-3-21	R	***Acton,** Hugh William, C.I.E., M.R.C.S., L.R.C.P., F.A.S.B., Lt.-Col., I.M.S. School of Tropical Medicine and Hygiene, Central Avenue, Calcutta.
7-12-25	N	**Afzal,** Syed Mohamad, Khan Bahadur, *Offg. Civil Surgeon, Bihar and Orissa Medical Service.* Civil Surgeon, Daltonganj.
2-3-21	R	**Agharkar,** Shankar Purushottam, M.A., Ph.D., F.L.S., *Professor of Botany, University College of Science.* 35, Ballygunge Circular Road, Calcutta.
7-4-30	N	**Ahmad,** Syed Khalil, *Provincial Service (retired).* Zafar Manzil, Gaya.
6-6-17	N	**Aiyangar,** K. V. Rangaswami, Rao Bahadur, M.A., *Director of Public Instruction, Travancore.* Trivandrum, Travancore.
6-12-26	N	***Aiyangar,** S. Krishnaswami, M.A., Ph.D., M.R.A.S., F.R. Hist.S., F.A.S.B., *Professor, University of Madras.* "Sripadam", 143, Brodies Road, Mylapore, Madras, S.
1-12-20	N	**Akbar Khan,** The Hon'ble Major Nawab Mohammed, C.I.E., I.A., *Khan of Hoti.* Hoti, N.-W.F.P.
6-5-29	R	**Aken,** Carel Emanuel van, *Manager, Java Bengal Line, Vice-Consul for the Netherlands.* c/o Messrs. Java Bengal Line, Clive Buildings, Calcutta.
3-7-12	N	**Andrews,** Egbert Arthur, B.A. Tocklai Experimental Station, Cinnamara, Jorhat, Assam.
1-4-29	R	**Asadullah,** K. M., B.A., *Librarian.* Imperial Library, Calcutta.
5-11-24	R	**Asaduzzaman,** Khan Bahadur. 42, Beniapukur Road, Calcutta.
3-3-30	L	**Ashton,** Hubert Shorrock, *Merchant.* Trueloves, Ingatestone, Essex, England.
3-11-30	R	**Austin,** George John, *Sanitary Engineer, Messrs. J. B. Norton & Sons, Ltd.* Norton Building, Lalbazar, Calcutta.

Date of Election.		
4-4-17	N	**Awati**, P. R., B.A. (Cantab.), D.I.C., I.E.S., *Professor of Zoology.* Royal Institute of Science, Mayo Road, Bombay.
3-3-14	L	**Bacot**, J., Boulevard Saint-Antoine, 61, Versailles, Seine-et-Oise, France.
1-11-26	R	**Bagchi**, Probodh Chandra, M.A., Dr.-ès-Lettres (Paris), *Member of the A.S. of Paris; Lecturer, Calcutta University.* 9, Rustomjee Street, Ballygunge, Calcutta.
1-3-26	R	**Bagnall**, John Frederick, *Consulting Engineer.* 6, Wood Street, Calcutta.
2-4-24	N	**Bahl**, K. N., D.SC., D.PHIL., *Professor of Zoology, Lucknow University.* Badshabagh, Lucknow.
5-11-24	N	**Baidil**, A. Mannan, *Assistant Superintendent, Dormitory.* Patna College, Bankipur.
7-3-27	N	**Bake**, A. A., *Doctorandus Or. Lit.* P.O. Santiniketan.
2-4-19	R	**Bal**, Surendra Nath, M.SC., F.L.S., *Curator, Industrial Section, Indian Museum.* 1, Sudder Street, Calcutta.
6-2-18	R	**Banerjee**, Narendra Nath, M.I.P.O.E.E., A.M.I.E., *Divisional Engineer, Telegraphs.* 42/1, Ritchie Road, Ballygunge, Calcutta.
1-3-26	R	**Banerjee**, Woomesh Chandra, *Colliery Proprietor and Merchant.* 7, Swallow Lane, Calcutta.
1-7-29	N	**Banerji**, Bijan Behari, M.SC. (All.), PH.D. (Lond.), F.P.S., A.INST.P., *Lecturer in charge of Department of Physics and Mathematics.* Indian School of Mines, Dhanbad.
1-3-05	R	**Banerji**, Muralidhar. Sanskrit College, Calcutta.
5-3-24	R	**Bannerjee**, P. N., M.A. (Cantab.), A.M.I.E., F.C.U., *Civil Engineer.* 12, Mission Row, Calcutta.
6-5-25	R	**Baral**, Gokul Chandra, *Zemindar, Municipal Councillor and Honorary Presidency Magistrate.* 3, Hidaram Banerjee's Lane, Calcutta.
1-11-26	N	**Barhut**, Thakur Kishoresingh Ji, *State Historian of Patiala Govt.* History and Research Department, Patiala.
7-12-21	R	**Barua**, B. M., M.A., D.LITT., *Lecturer, Calcutta University.* Chandernagore, E.I.Ry.
3-8-31	N	**Barua**, The Hon'ble Kanak Lal, Rai Bahadur, B.L., *President, Kamarupa Anusundhan Samiti, Minister to the Government of Assam.* Shillong, Assam.
3-12-23	R	**Barwell**, N. F., Lt.-Col. (Retd.), M.C., M.A., *Bar.-at-Law.* First Floor, 10, Middleton Street, Calcutta (*and*) Aylmerton House, Aylmerton, Norfolk, England.
7-5-28	R	**Basak**, Sarat Chandra, M.A., D.L., *Advocate, High Court.* 24, Ashutosh Mukherjee Road, Calcutta.
6-1-30	R	**Bassewitz**, Count, *Consul-General for Germany.* 227-1, Lower Circular Road, Calcutta.
4-3-29	R	**Basu**, Bejoy K., M.A., B.L., *Solicitor, High Court.* 50, Goaltule Road, Bhawanipore, Calcutta.
3-12-24	R	**Basu**, Jatindra Nath, M.A., M.L.C., *Solicitor.* 14, Baloram Ghose Street, Calcutta.
1-3-26	R	**Basu**, Narendra Kumar, M.L.C., *Advocate, High Court.* 12, Ashu Biswas Road, Bhawanipore, Calcutta.
2-1-28	R	**Basu**, Narendra Mohun, M.A., *Professor of Physiology.* Presidency College, Calcutta.
7-5-28	R	**Basu**, Narendranath, L.M.S., *Professor of Obstetrics and Gynæcology, Carmichael Medical College.* 7, Raja Bagan Street, Calcutta.

Date of Election.		
7-1-29	R	**Basu**, Sarat Chandra, *Advocate.* 143, Dhurrumtollah Street, Calcutta.
7-7-09	N	**Bazaz**, Rangnath Khemraj, *Proprietor, Shri Venkateshwar Press.* 7th Khetwadi, Bombay No. 4.
3-7-95	L	**Beatson-Bell**, Rev. Sir Nicholas Dodd, K.C.S.I., K.C.I.E. Edgecliffe, St. Andrews, Scotland.
4-3-25	R	**Benthall**, E. C., *Merchant.* 37, Ballygunge Park, Calcutta.
7-4-09	L	***Bentley**, Charles A., C.I.E., M.B., D.P.H., D.T.M. & H., F.A.S.B., *Professor of Hygiene.* University of Egypt, Cairo.
4-11-29	R	**Berthoud**, George Felix, *Stock-broker* 7, Hungerford Street, Calcutta.
4-6-28	N	**Bhadra**, Satyendra Nath, Rai Bahadur, M.A., *Principal.* Jagannath Intermediate College, Dacca.
3-5-26	N	**Bhagwant Rai**, Munshi Rai, Sardar, M.P.H.S., *Retired District Judge.* Bhagwant Ashram, Patiala.
1-8-17	R	***Bhandarkar**, Devadatta Ramkrishna, M.A., PH.D., F.A.S.B. 35, Ballygunge Circular Road, Calcutta.
6-6-23	N	**Bhanot**, Kali Das, *Late Superintendent, Forests, Jubbal State.* Mokandpur, Dt. Jullundur.
5-4-26	N	**Bhatia**, M. L., M.SC., *Lecturer in Zoology.* Lucknow University, Lucknow.
4-3-25	N	**Bhatnagar**, Jagmohan Lal, M.A., *Professor of History.* Randhir College, Kapurthala.
2-4-28	R	**Bhattacharjee**, Nibaran Chandra, M.A., *Professor of Physiology, Presidency College.* 19, Hindusthan Road, Ballygunge, Calcutta.
5-1-31	R	**Bhattacharjee**, Umesh Chandra, M.A., *Professor of Philosophy, Bethune College.* 181, Cornwallis Street, Calcutta.
7-7-09	R	**Bhattacharji**, Shib Nath, M.B. 80, Shambazar Street, Calcutta.
4-11-08	R	**Bhattacharya**, Bisvesvar, B.A., M.R.A.S., B.C.S. 16, Townshend Road, Bhawanipore, Calcutta.
1-2-22	N	**Bhattacharya**, Vidhushekhara, Pandit, *Principal, Vidyabhavana.* Visvabharati, Santiniketan, Birbhum.
7-7-24	L	**Bhattacharyya**, Binoytosh, M.A., PH.D., *General Editor, Gaekwad's Oriental Series, and Librarian, Oriental Collections, Baroda State.* Baroda.
9-6-22	R	**Bhattacharyya**, Sivapada, M.D. School of Tropical Medicine and Hygiene, Central Avenue, Calcutta.
4-6-28	N	**Bhattasali**, Nalini Kanta, M.A., *Curator, Dacca Museum.* Ramna, Dacca.
6-4-31	R	**Bhose**, Jotish Chander, M.A., B.L., *Advocate, Calcutta High Court.* 24A, Ray Bagan Street, Calcutta.
5-3-28	R	**Biswas**, Charu Chandra, M.A., B.L., *Advocate, High Court.* 58, Puddopukur Road, P.O. Elgin Road, Calcutta.
1-8-23	R	**Biswas**, Kalipada, M.A. Royal Botanic Gardens, Sibpur, Howrah.
3-1-27	N	**Bivar**, Hugh Godfrey Stuart, I.C.S., *District and Sessions Judge.* Murshidabad.
6-12-22	A	**Blackett**, Sir Basil Phillott, K.C.B., *Finance Member, Government of India.* Delhi.
1-2-93	L	***Bodding**, Rev. P. O., M.A. (Christ.), F.A.S.B. Mohulpahari, Santhal Parganas.
3-7-12	N	**Bomford**, Trevor Lawrence, M.B., B.S., M.R.C.S., L.R.C.P., Lt.-Col., I.M.S. Civil Surgeon, Dacca.
4-3-29	R	**Boral**, Arun Prokash, *Merchant and Landholder,* 9-1, Sikdarpara Street, Calcutta.

Date of Election.		
3-7-18	R	**Bose,** CHARU CHANDRA, B.A., M.B., *Professor of Pathology, Carmichael Medical College.* 52/2, Mirzapur Street, Calcutta.
6-5-25	R	**Bose,** H. M., B.A., *Bar.-at-Law.* 177, Lower Circular Road, Calcutta.
6-3-95	R	***Bose,** SIR JAGADIS CHANDRA, KT., C.S.I., C.I.E., F.R.S., M.A., D.SC., F.A.S.B. Bose Institute, 91, Upper Circular Road, Calcutta.
5-4-22	N	**Bose,** JOGESH CHANDRA, VIDYABINODE, *Landholder.* Bhagwanpur, Dt. Midnapore.
6-7-25	R	**Bose,** MANMATHA MOHAN, M.A., *Professor, Scottish Churches College.* 19, Gokul Mitra Lane, Hatkhola, Calcutta.
2-3-31	N	**Bose,** SUDHANSU KUMAR, B.SC. (CAL.), A.R.S.M., B.SC. (MINING), *London, Professor of Mining and Surveying.* Indian School of Mines, Dhanbad.
5-11-28	N	**Bose Mullick,** G. N., M.A., *Professor of History.* Meerut College, Meerut, U.P.
4-5-31	R	**Bottomley,** JOHN MELLOR, B.A. (OXON.), I.E.S., *Offg. Director of Public Instruction, Bengal.* Writers' Buildings, Calcutta.
6-12-26	R	**Brahmachari,** BIPIN BIHARI, D.P.H., *Asst. Director of Public Health, Bengal.* 283, Ballygunge Avenue, Calcutta.
4-1-26	A	**Brahmachari,** INDU BHUSAN, *University Lecturer.* 110-2, Dhakuria Road, Kalighat, Calcutta.
1-1-08	L	***Brahmachari,** UPENDRA NATH, RAI BAHADUR, M.A., PH.D., M.D., F.A.S.B. 82/3, Cornwallis Street, Calcutta.
7-11-27	N	**Brahmachary,** SARAT CH., RAI BAHADUR, M.A., B.T., *Superintendent.* Kasba Road, Ballygunge, P.O. Dhakuria, Calcutta.
4-4-27	R	**Bridge,** REV. PETER GONZALEZ, D.D., *Principal, St. Paul's College.* 33/1, Amherst Street, Calcutta.
3-7-07	L	***Brown,** JOHN COGGIN, O.B.E., D.SC., F.G.S., M.I.M.E., M.INST.M.M., M.I.E., F.A.S.B. Geological Survey of India, Indian Museum, Calcutta.
6-10-09	A	**Brown,** PERCY, A.R.C.A. Government School of Art, Calcutta.
2-7-24	F	**Browne,** REV. L. E., M.A. 21, The Drive, Northampton, England.
6-10-09	L	***Brühl,** PAUL JOHANNES, I.S.O., D.SC., F.C.S., F.G.S., F.A.S.B. 2, Convent Road, Bangalore.
8-1-96	F	***Burn,** SIR RICHARD, KT., C.S.I., F.A.S.B. 9, Staverton Road, Oxford, England.
2-4-13	R	**Calder,** CHARLES CUMMING, B.SC., F.L.S. Royal Botanic Gardens, Sibpur, Howrah.
7-1-29	R	**Campbell Forrester,** MRS. FLORENCE, *Fellow of the Archæological Society of America.* Y.W.C. Association, 134, Corporation Street, Calcutta; 1700, R.I. Avenue, Washington, D.C., U.S.A.
4-11-29	R	**Campbell,** G. R., *Partner, Messrs. Mackinnon Mackenzie & Co.* 16, Strand Road, Calcutta.
7-2-27	R	**Captain,** DARA MANEKSHAW, *Merchant.* 1, Corporation Street, Calcutta.
1-9-20	R	**Chakladar,** HARAN CHANDRA, M.A. 28/4, Srimohan Lane, Kalighat, Calcutta.
4-7-27	R	**Chakravarti,** CHINTAHARAN, M.A., *Lecturer, Bethune College.* 28/3, Sahanagar Road, Kalighat, Calcutta.

Date of Election.		
3-2-30	N	**Chakravarti**, M. N., M.SC., *A.T.S. at Delhi.* 5053, Connaught Place, New Delhi.
3-3-09	R	**Chakravarti**, Nilmani, M.A. 103-A, Kalighat Road, Calcutta.
3-1-27	N	**Chakravarty**, Niranjanprasad, PH.D. (Cantab.), *Government Epigraphist.* Office of the Government Epigraphist, Ootacamund, Nilgiris, S. India.
6-1-30	R	**Chakraverti**, Shrish Chandra, B.L., *Attorney-at-Law, High Court, Calcutta.* 2, Marquis Street, Calcutta.
1-9-20	R	*__Chanda__, Ramaprasad, Rai Bahadur, B.A., F.A.S.B. P. 463, Manoharpukur Road, Kalighat, Calcutta.
3-1-06	L	**Chapman**, John Alexander, *Librarian, Rampur State Library.* Rampur.
7-5-28	R	**Chatterjea**, Sir Nalini Ranjan, KT., M.A., B.L., *Retired Judge and sometime acting Chief Justice, Calcutta High Court.* 91A, Harish Mukerjee Road, Bhawanipore, Calcutta.
7-2-27	R	**Chatterjee**, Ashoke, B.A. (Cal.), B.A. (Cantab.), *Editor, "Welfare."* 91, Upper Circular Road, Calcutta.
27-10-15	F	**Chatterjee**, Sir Atul Chandra, K.C.I.E., K.C.S.I., *High Commissioner for India.* Withdean, Cavendish Road, Weybridge, Surrey, England.
1-10-20	R	**Chatterjee**, Nirmal Chandra. 52, Haris Mukerjee Road, Bhawanipore, Calcutta.
4-7-27	R	**Chatterjee**, Patitpabon, M.A., B.L., *Vakil, High Court.* 84, Harrison Road, Calcutta.
5-1-31	N	**Chatterji**, Durgacharan, M.A., P.R.S., *Lecturer in Sanskrit, Krishnagar College.* Krishnagar, Nadia.
7-5-28	R	**Chatterji**, Kedar Nath, B.SC. (London), A.E.C.S. (London). 2-1, Townshend Road, Calcutta.
7-6-11	R	**Chatterji**, Karuna Kumar, LT.-COL., I.T.F., M.C., V.H.A.S. 6/1, Wood Street, Calcutta.
5-3-24	R	**Chatterji**, Mohini Mohan, M.A., B.L., *President, Incorporated Law Society of Calcutta.* 33, McLeod Street, Calcutta.
6-8-24	R	**Chatterji**, Suniti Kumar, M.A., D.LIT., *Khaira Professor, Calcutta University.* 21, Hindusthan Road, Ballygunge, Calcutta.
5-11-24	R	**Chattopadhyay**, K. P., M.A. (Cantab.), *Education Officer, Corporation of Calcutta.* 20, Mayfair, Ballygunge, Calcutta.
2-11-25	N	**Chattopadhyaya**, Kshetresa Chandra, M.A., *Lecturer in Sanskrit.* Allahabad University, Allahabad.
2-1-28	N	**Chaube**, Ram Kumar, Pandit, M.A., L.T. (Benares), M.A. (Cal.), M.R.A.S. (Lond.), *Member, Benares Mathematical Society* Azmatgarh Palace, Benares.
1-4-14	A	**Chaudhuri**, Gopal Das. 32, Beadon Row, Calcutta.
4-3-25	R	**Chaudhuri**, J., B.A. (Oxon.), M.A. (Cal.), *Barrister-at-Law.* 34, Ballygunge Circular Road, Calcutta.
3-8-25	N	**Chhibber**, H. L., M.SC., F.G.S., F.R.G.S., *Asst. Superintendent, Geological Survey of India, Burma Party.* 230, Dalhousie Street, Rangoon.
6-12-26	R	**Chokhani**, Sreenarayan, *Secretary, Shree Hanuman Pustkalaya.* 8, New Ghuseri Road, Salkea, Howrah.
5-12-23	R	**Chopra**, B. N., D.SC., *Asst. Superintendent, Zoological Survey of India.* Indian Museum, Calcutta.
1-2-22	R	*__Chopra__, R. N., M.B., F.A.S.B., LT.-COL., I.M.S., *Professor of Pharmacology.* School of Tropical Medicine and Hygiene, Central Avenue, Calcutta.
5-11-28	R	**Chopra**, Gopichand, *Student.* 47, Khangraputty, Calcutta.

Date of Election.		
7-5-28	R	**Chowdhury,** A. N., B.SC., *Zemindar.* 42, Hem Chandra Street, Kidderpore, Calcutta.
5-12-27	L	**Chowdhury,** Chhajuram, C.I.E., M.L.C., 21, Belvedere Road, Calcutta.
2-4-28	R	**Chowdhury,** Rai Jatindranath, *Zemindar.* 36, Russa Road, Tollygunge, Calcutta.
3-7-07	L	***Christie,** William Alexander Kynoch, B.SC., PH.D., M.INST.M.M., F.A.S.B. 10, Inkerman Terrace, London, W. 8.
3-11-09	N	***Christophers,** Samuel Rickard, C.I.E., O.B.E., F.R.S., F.A.S.B., M.B., LT.-COL., I.M.S. Central Research Institute, Kasauli.
1-9-15	R	**Cleghorn,** Maude Lina West (Miss), F.L.S., F.E.S. 12, Alipur Road, Calcutta.
2-2-31	R	**Clough, John,** *Barrister-at-Law, Bar Library, High Court.* Calcutta.
1-12-20	A	**Connor,** Sir Frank Powell, KT., LT.-COL., I.M.S., D.S.O., F.R.C.S., *Professor of Surgery, Medical College.* 2, Upper Wood Street, Calcutta.
5-5-30	R	**Cooper,** G. A. P., *Assistant, Messrs. Macneil & Co.* 2, Fairlie Place, Calcutta.
4-11-29	R	***Cotter,** Gerald de Purcell, B.A., SC.D., M.INST.M.M., F.G.S., F.A.S.B., *Superintendent, Geological Survey of India.* Indian Museum, Calcutta.
3-8-25	R	**Coyajee,** Sir J. C., KT., B.A. (Cantab.), LL.B., I.E.S., *Professor, Presidency College.* 2B, Camac Street, Calcutta.
25-8-87	R	**Criper,** William Risdon, F.C.S., F.I.C., A.R.S.M. Konnagar.
2-11-25	R	**Crookshank,** Henry, B.A., B.A.I. (Dublin), *Assistant Superintendent, Geological Survey of India.* Indian Museum, Calcutta.
4-3-25	R	**Das,** Rai Bahadur Ajit Nath, M.R.A.S., F.Z.S., *Zemindar.* 24, South Road, Entally, Calcutta.
2-4-24	R	**Das,** Biraj Mohan, M.A. (Cal.), M.SC. (Lond.), *Superintendent, Calcutta Research Tannery.* 2/1, Kirti Mitter Lane, Calcutta.
5-3-28	R	**Das,** Kedarnath, C.I.E., M.D., *Principal, Carmichael Medical College.* 22, Bethune Row, Calcutta.
2-7-28	R	**Das,** Probodh Kumar, M.A., B.L. P-84, Park Street Extension, Calcutta.
3-12-24	R	**Das,** Surendra Nath, M.B., *Medical Practitioner.* 67, Nimtala Ghat Street, Calcutta.
1-9-15	R	**Das-Gupta,** Hem Chandra, M.A., F.G.S., *Professor, Presidency College.* 60, Chakrabere Road, North, Calcutta.
6-9-22	R	**Das-Gupta,** Surendra Nath, M.A., PH.D., *Professor of Sanskrit and Philosophy, Presidency College.* 104, Bakul Bagan Road, Calcutta.
1-3-26	R	**Datta,** Hirendra Nath, M.A., B.L., *Solicitor, High Court.* 139, Cornwallis Street, Calcutta.
3-6-25	F	**Datta,** S. K., B.A., M.B., CH.B. (Edin.). 2, Rue Général Dafour, Geneva, Switzerland.
6-8-24	L	**Davies,** L. M., Major, *Royal Artillery.* c/o The Lloyds Bank, King's Branch, 6, Pall Mall, London.
4-3-29	R	**De,** J. C., M.B., Major, I.M.S., *Professor of Clinical Medicine, Medical College.* 13, Camac Street, Calcutta.

Date of Election.		
4-2-29	F	**de Gasparin,** Edith. *Art Student.* 51, Rue de Varenne, Paris VIIe.
19-9-95	L	**De,** Kiran Chandra, C.I.E., B.A., I.C.S. (Retired). 21, Camac Street, Calcutta.
6-6-17	R	**Deb,** Kumar Harit Krishna, M.A., *Zemindar.* 8, Raja Nabokishen Street, Calcutta.
4-3-25	R	**Deb,** Raja Kshitindra, Rai Mahasai of Bansberia Raj. 21/E, Rani Sankari Lane. Kalighat, Calcutta.
4-3-29	R	**Deb,** Pasupati Nath, *Zemindar and Landholder, Honorary Presidency Magistrate.* P-16, Chittaranjan Avenue, North, Calcutta.
5-12-27	L	**Dechhen,** H.H. Maharani Kunzang, *Maharani of Sikkim.* Gangtok, Sikkim.
5-5-30	N	**Deo,** Pratap Chandra Bhanj, *Maharajah, Ruler of Mayurbhanj State.* P.O. Baripada, Mayurbhanj, B.N.R.
4-2-29	N	**Dev,** Raja Ramchandra, *Superintendent.* Jagannath Temple, Puri.
4-4-27	R	**Dewick,** Rev. Edward Chisholm, M.A. (Cantab.), *National Literature Secretary, Y.M.C.A. of India, Burmah and Ceylon.* 5, Russell Street, Calcutta.
4-5-10	L	**Dhavle,** Sankara Balaji, B.A., I.C.S., *Judge, Patna High Court.* Patna.
4-8-20	R	**Dikshit,** Kashinath Narayan, M.A., *Superintendent, Archæological Survey of India.* Indian Museum, Calcutta.
5-1-98	R	**Dods,** William Kane, *Agent, Hongkong and Shanghai Banking Corporation.* 6, Minto Park, Alipur, Calcutta.
2-2-31	N	**Douglas,** Gordon Watson, B.SC., D.L.M., *State Chemist to the Government of Bhopal, State Laboratory.* Bhopal, Central India.
6-1-30	N	**Douglas,** Robert, *Indian Civil Service, District Magistrate.* Burdwan.
2-7-02	L	**Doxey,** Frederick. 63, Park Street, Calcutta.
6-8-28	R	**Drummond,** J. G., M.A., I.C.S., J.P.. *Secretary, Local Self-Government, Government of Bengal.* 4, Theatre Road, Calcutta.
1-7-29	R	**Dunn,** John Alexander, D.SC., D.I.C., F.G.S, *Assistant Superintendent, Geological Survey of India.* Indian Museum, Calcutta.
7-1-25	R	**Dutt,** Kiran Chandra, *Zemindar.* Lakshmi Nibas, 1, Lakshmi Dutt Lane, Baghbazar, Calcutta.
7-4-20	R	**Dutt,** Kumar Krishna. 10, Hastings Street, Calcutta.
5-3-28	R	**Eberl,** Otto, Dr. Jur., *Vice-Consul for Germany.* 2, Store Road, Ballygunge, Calcutta.
4-11-29	R	**Edwards,** L. Brooke, *Manager in India. The Baldwin Loco. Works of Philadelphia, U.S.A.* 5, Dalhousie Square, Calcutta.
7-12-31	F	**Eliade,** Mircea, *Docteur en Philosophie, Conferentiaire Universitaire.* 1, Str. Melodiei, Bucharest (1).
6-2-28	R	**Evans,** Frank Lucas, *Insurance Manager, Century Insurance Co.* 4, Lyons Range, Calcutta.
5-1-31	L	**Evans,** Percy, B.A. (Cantab.), F.G.S., *Geologist,* c/o *The Assam Oil Co., Digboi, Assam.*
6-2-28	L	**Ezra,** Sir David, KT., F.Z.S., M.B.O.U. 3, Kyd Street, Calcutta.
2-12-29	R	**Fawcus,** Louis Reginald, B.A. (Cantab.), *Indian Civil Service.* United Service Club, Calcutta.

Date of Election.		
3-8-04	R	***Fermor**, Lewis Leigh, o.b.e., a.r.s.m., d.sc., f.g.s., f.a.s.b. Geological Survey of India, Indian Museum, Calcutta.
31-10-06	N	**Finlow**, Robert Steel, c.i.e., b.sc., f.i.c., *Director of Agriculture, Bengal.* Ramna, Dacca.
2-12-29	R	**Fisher**, The Rev. Bishop Frederick B., s.t.b., ph.d., d.d., ll.d., f.r.s.s., *Bishop, Methodist Episcopal Church.* 3, Middleton Street, Calcutta
7-11-27	R	**Fitzgerald**, T. J., *Manager, U.S. Rubber Export Co.* 5, Hastings Street, Calcutta.
4-1-26	R	**Fleming**, Andrew, *General Manager for the East, Minimax, Ltd.* 59, Park Street, Calcutta.
5-1-31	R	**Fooks**, Herbert A. 2, Short Street, Calcutta.
5-11-13	R	**Fox**, Cyril S., b.sc., m.i.m.e., f.g.s. Geological Survey of India, Indian Museum, Calcutta.
2-2-31	R	**Fraser**, William Archibald Kenneth, lt.-col., c.b.e., d.s.o., m.v.o., m.c., *Military Officer.* Government House, Calcutta.
2-4-19	N	**Friel**, Ralph, i.c.s. Silchar, Assam.
7-3-27	F	**Fukushima**, Naoshiro, *Assistant in the Sanskrit Seminary.* Imperial University, Tokio, Japan.
5-3-28	R	**Fullerton**, George MacFarland, b.sc., *Banking.* c/o The National City Bank of New York, 4, Clive Street, Calcutta.
4-1-26	N	**Gaffar**, Abdul, Khan Bahadur, *Deputy Collector.* Midnapur.
5-11-28	R	**Galstaun**, John Carapiet, *Merchant and Landholder.* 234/4, Lower Circular Road, Calcutta.
1-11-26	R	**Galstaun**, Shanazan, m.a., d.m.r.e., m.r.c.s., l.r.c.p., *Medical Practitioner, Radiologist, Medical College Hospital.* 39, Theatre Road, Calcutta.
6-10-09	R	**Gangoly**, Ordhendra Coomar, b.a. 12/1, Gangoly Lane, Calcutta.
7-5-28	R	**Ghosal**, Upendra Nath, m.a., ph.d., *Professor of History, Presidency College.* 12, Badur Bagan Row, Calcutta.
5-4-26	R	**Ghose**, Bimal Chandra, *Barrister-at-Law.* 27/1, Harish Mukherjee Road, Calcutta.
2-4-24	R	**Ghose**, Sir Charu Chandra, kt., *Barrister-at-Law, Judge, High Court.* 10, Debendra Ghose Road, Bhawanipore, Calcutta.
1-4-29	R	**Ghose**, Deb Prosonno, *Zemindar.* 75, Beadon Street, Calcutta.
7-1-29	R	**Ghose**, Mohim Chandra, b.a. (Cal.), m.a. (Cantab.), *Barrister-at-Law (Inner Temple).* Indian Civil Service, Bengal Secretariat, Calcutta.
3-12-24	R	**Ghose**, Sushil Chandra, b.a., *Deputy Magistrate.* 1, Sikdarbagan Street, Calcutta.
7-2-27	N	**Ghosh**, Jnanendra Chandra, d.sc., *Professor of Chemistry, Dacca University.* Ramna, Dacca.
2-4-24	R	**Ghosh**, K., d.t.m., d.p.h. (Cantab.), l.m.s., *Medical Practitioner.* 45, Creek Row, Calcutta.
5-12-27	R	**Ghosh**, Kisor, m.sc., *Solicitor.* 10, Hastings Street, Calcutta.
6-2-18	L	**Ghosh**, Ekendra Nath, m.d., m.sc., f.z.s., f.r.m.s., *Professor of Biology, Medical College.* 66, Cornwallis Street, Calcutta.

Date of Election.		
7-3-27	R	**Ghosh**, Phanindra Nath, M.A., Ph.D., Sc.D. (Padua), *Sir Rashbehary Ghosh Professor of Applied Physics, University of Calcutta.* 92, Upper Circular Road, Calcutta.
5-5-20	R	**Ghosh**, Sukhendra Nath, B.A. (Cal.), B.Sc. (Glas.), M.I.C.E., F.R.San.I., M.I.E., *Executive Engineer, P.W.D., Central Division, Bengal.* 7, Heysham Road, Calcutta.
4-9-12	R	**Ghosh**, Tarapada. 14, Paddapukur Street, Kidderpore, Calcutta.
1-2-26	R	**Ghuznavi**, A. H., M.L.A., *Merchant and Zemindar.* 18, Canal Street, Entally, Calcutta.
6-8-28	R	**Ghuznavi**, Iskander S. K., *Zemindar and Member, Advisory Board of Industries, Government of Bengal.* 30, Theatre Road, Calcutta, (*and*) Dilduar, Mymensingh.
1-2-26	R	**Ghuznavi**, The Hon'ble Alhadj Sir Abdelkerim Abu Ahmed Khan, Kt., M.L.C., *Zemindar of Dilduar.* 39, Theatre Road, Calcutta, (*and*) North House, Dilduar, Mymensingh.
1-4-29	A	**Ginwala**, Sir Padamji, *President, Indian Tariff Board.* 1, Council House Street, Calcutta.
4-3-29	R	**Goil**, D. P., Lt.-Col., I.M.S., M.B., F.R.C.S.E., *Civil Surgeon, Principal, Medical College.* Calcutta.
5-3-28	R	**Gooptu**, Dwijendra Nath, *Medical Practitioner and Landholder.* 5, Middleton Street, Calcutta.
7-9-10	N	***Gravely**, Frederic Henry, D.Sc., F.A.S.B. Museum House, Egmore, Madras.
5-12-00	L	**Grieve**, James Wyndham Alleyne. c/o Messrs. Coutts & Co., 440, Strand, London, W.C. 2.
4-2-25	R	**Guha**, B. S., M.A., Ph.D. (Harvard). Indian Museum, Calcutta.
6-12-26	R	**Guha**, Surendranath, Rai Bahadur, *Judge, High Court.* 18, Ram Mohan Dutt Road, Bhawanipur, Calcutta.
1-3-26	N	**Gupta**, Dhirendra Nath, Major, I.M.S., *Behar and Orissa Medical Service.* Assistant Surgeon, Sadar Hospital, Arrah.
7-5-28	R	**Gupta**, J. N., M.B.E., C.I.E., I.C.S., *Late Member, Board of Revenue, Government of Bengal.* 7, Pretoria Street, Calcutta.
5-3-19	N	**Gupta**, Sivaprasad. Seva Upavana, Benares City.
5-8-15	N	**Gurner**, Cyril Walter, I.C.S., *District Magistrate.* Mymensingh.
6-3-01	N	**Habibur** Rahman Khan, *Rais.* Bhikanpur, District Aligarh.
6-1-30	R	**Haldar**, Sudhindra Kumar, *Indian Civil Service, Calcutta Club.* 241, Lower Circular Road, Calcutta.
6-1-30	F	**Hamilton**, Sir Daniel Mackinnon, *Retired Partner, Messrs. Mackinnon Mackenzie & Co.* Balmacara, Rosshire, Scotland.
2-4-24	R	**Haq**, M. Mahfuz-ul, M.A., *Lecturer, Presidency College.* 13/1, Collin Lane, Calcutta.
2-4-28	N	**Hargopal**, Pandit, *Government Jagirdar, Landlord.* Turkman Gate, Delhi.
1-5-12	R	**Harley**, Alexander Hamilton, M.A., I.E.S., *Principal.* Islamia College, Calcutta.
1-2-26	R	**Harris**, H. G., *Director, Messrs. Martin & Harris, Ltd.* 8, Waterloo Street, Calcutta.
2-4-28	R	**Harris**, Lawrence Ernest, *Engineer, Manager for India, Messrs. Sulzer Brothers.* 11, Clive Street, Calcutta.
5-3-28	R	**Hawes**, George Laurence, M.C., *Underwriter.* 4, Merlin Park, Ballygunge, Calcutta.

Date of Election.		
4-4-27	N	**Helland,** BERNHARD ALVIN, B.A., *Augsburg College (U.S.A.)*, B.D., *Augsburg Seminary (U.S.A.)*, M.A., *University of Minnesota (U.S.A.), Missionary-Teacher, under appointment as Principal, Kaerabani Boys' Middle English and Guru Training School.* Kaerabani, via Dumka, Santal Parganas.
5-11-19	N	**Hemraj,** RAJ GURU, PANDIT. Dhokatol, Nepal.
3-2-30	R	**Henderson,** ALEXANDER GAVIN, B.A. (OXON). Buscot Park, Faringdon, Berks; Flat No. 9, 4, Elysium Row, Calcutta.
3-12-24	R	**Hendry,** C. A. JOHN, F.R.G.S., M.I.S.E., A.M.I.M.E., M.I.E. M.MIN.I., *Consulting Mechanical Engineer, Messrs. Martin & Co.* 12, Mission Row, Calcutta.
6-8-28	R	**Heron,** A. M., D.SC. (EDIN.), F.G.S., F.R.G.S., F.R.S.E., *Superintendent, Geological Survey of India.* Indian Museum, Calcutta.
7-6-11	R	***Hidāyat Ḥosain,** MUHAMMAD, S̱HAMS UL-'ULAMA, KHAN BAHADUR, PH.D., F.A.S.B. 96/2c, Collin Street, Calcutta.
1-2-26	R	**Hingston,** H., Lt.-Col., I.M.S., M.D., *Surgeon to H.E. the Governor of Bengal.* 5, Wellesley Place, Calcutta.
4-6-28	N	**Hobart,** ROBERT CHARLES, I.C.S., *Collector.* Bareilly, U.P.
1-4-25	R	**Hobbs,** HENRY, *Merchant.* 4, Esplanade East, Calcutta.
7-3-27	N	**Hopkinson,** ARTHUR JOHN, I.C.S. Kahalla, Nathiagali, N.-W.F.P.
2-11-21	L	***Hora,** SUNDER LAL, D.SC., F.Z.S., F.R.S.E., F.A.S.B. Zoological Survey of India, Indian Museum, Calcutta.
2-7-28	R	**Hossain,** NAWAB MUSHARRUF, KHAN BAHADUR, M.L.C. 42-A, Hazra Road, Calcutta.
6-6-23	L	***Howard,** A., C.I.E., M.A., F.A.S.B., *Director, Institute of Plant Industry, and Agricultural Adviser to States in Central India.* Indore, C.I.
4-1-26	R	**Hubert,** OTTO, *Chancellor to the German Consulate General.* 2, Store Road, Ballygunge, Calcutta.
2-5-27	F	**Hürlimann,** MARTIN, DR. PHIL. Sihlberg, Zurich 2, Switzerland.
6-6-23	N	***Hutton,** J. H., C.I.E., I.C.S., M.A., D.SC., F.A.S.B., *Census Commissioner of India.* Chelmsford Club, New Delhi.
7-2-27	N	**Imam,** ABU MOHAMMAD SYED HASSAN, *Zemindar.* Hasnain Manzil, Gaya, E.I.R.
1-2-11	L	**Insch,** JAMES. c/o Messrs. Duncan Bros. & Co., 101, Clive Street, Calcutta.
5-11-28	R	**Ishaque,** MOHAMMAD, M.A., B.SC., M.R.A.S., *Lecturer, Calcutta University.* 6, Hospital Street, P.O. Dhurrumtollah, Calcutta.
4-3-29	N	**Iyer,** MANDAKOLATORE SUBRAHMANYA. 879, Nagamaram Lane, East Gate, Fort, Tanjore.
5-12-23	R	**Jackson,** P. S. 14, Old Court House Street, Calcutta.
6-6-27	L	**Jain,** BALDEODAS, *Merchant and Banker.* 21, Armenian Street, Calcutta.
2-2-21	R	**Jain,** CHHOTE LAL, M.R.A.S. 25, Central Avenue North, Calcutta.
6-1-30	N	**Jain,** NIRMAL KUMAR. Devashrama, Arrah.
6-8-28	N	**Jaitly,** P. L., *Electrical Engineer, Merchant.* 15, Canning Road, Allahabad.
1-11-26	N	**Jameson,** THOMAS BLANDFORD, MAJOR, M.C., M.A. (CANTAB.), I.C.S., *District and Sessions Judge.* Midnapore.
4-11-29	R	**Jarvis,** ROBERT Y., *Consul of the United States of America.* 9, Esplanade Mansions, Calcutta.

Date of Election.		
6-5-25	R	**Jatia**, SIR ONKAR MULL, KT., O.B.E., *Merchant.* 2, Rupchand Roy Street, Calcutta.
4-2-29	R	**Jenkins**, WALTER ALLEN, D.SC. (SHEFFIELD), I.E.S., M.L.C. United Service Club, Calcutta.
5-4-26	A	**Jones**, THORNTON, *Solicitor.* c/o Messrs. Morgan & Co., 1, Hastings Street, Calcutta.
2-4-24	R	**Judah**, N. J., M.B., CH.B., F.R.C.S. 43, Chowringhee, Calcutta.
1-11-11	L	**Kamaluddin** AHMAD, SHAMS-UL-‘ULAMĀ, M.A., I.E.S., *Inspector of Schools, Chittagong Division.* Chittagong.
5-3-24	R	**Kanjilal**, M. N., M.A. (CAL.), LL.B. (CANTAB.), *Barrister-at-Law.* 17, Loudon Street, Calcutta.
6-5-29	N	**Kapur**, DIWAN RAM CHANDRA, *Millowner and Banker.* Diwan Balmokund Kapur Lane, Benares City.
5-11-24	R	**Kapur**, SHAMLAL, *Import and Banking.* 84, Khengrapatty, Calcutta.
1-2-26	N	**Kashyap**, SHIV RAM, RAI BAHADUR, B.A., M.SC., I.E.S., *Professor of Botany.* Government College, Lahore.
10-6-12	R	**Kazim Shirazi**, AGA MOHAMMED. 16A, Ahiripukur 1st Lane, Ballygunge, Calcutta.
4-5-10	L	***Kemp**, STANLEY W., B.A., D.SC., F.A.S.B. "Discovery Expedition," 52, Queen Anne Chambers, Dean Farrar Street, London, S.W. 1.
2-5-30	N	**Kenny**, DICK EDWARD COURTENAY, MAJOR, I.A., *Deputy Commissioner, Andamans.* Port Blair, Andamans.
6-2-28	F	**Kewal**, GANDA SINGH, PH. B.SC., I.O.G.E., F.R.G.S. (LONDON), F.T.S., F.I.A.SC. (LONDON). Post Box No. 1, Abadan (Persian Gulf).
1-2-26	R	**Khambata**, R. B., M.R.C.S., L.R.C.P., D.P.H., *Director of Public Health Laboratory and Professor of Laboratory Practice, School of Tropical Medicine and Hygiene.* 2-B, Camac Street, Calcutta.
2-12-29	N	**Khan**, MATIUR RAHMAN, *Landholder and Service Holder.* P.O. Lalmohan, Dt. Bakerganj.
3-12-24	R	**Khan**, REZAUR RAHMAN, M.A., B.L., *Late Deputy Sheriff, Calcutta.* 28, Convent Road, Entally, Calcutta.
6-5-25	R	**Khanna**, VINAYEK LAL, M.R.A.S., *Merchant.* 137D, Balaram Dey Street, Beadon St. P.O., Calcutta.
2-8-26	R	**Khettry**, BENIMADHO, *Proprietor, Messrs. Gouri Shanker Khettry, Landholders, Bankers and Merchants.* 15, Paggiyapatti, Barabazar, Calcutta.
2-11-25	A	**Kimura**, R. (Ko-Shi), *Principal, College Department of Rissho University.* Osaki Machi, Tokyo, Japan.
7-7-20	R	***Knowles**, ROBERT, M.R.C.S., L.R.C.P., B.A. (CANTAB.), F.A.S.B., LT.-COL., I.M.S. 63, Park Street, Calcutta.
6-5-25	A	**Koester**, HANS, *Vice-Consul for Germany.* 17/1, Store Road, Ballygunge, Calcutta.
5-3-23	N	**Korke**, VISHNU TATYAJI, CAPTAIN, F.R.C.P. (EDIN.). Central Research Institute, Kasauli.
3-2-30	R	**Korni**, MICHAEL ALEXANDROWITZ, (DR.), *Architect and Engineer, Messrs. Bird & Co.* 53, Chowringhee Road, Calcutta.
2-3-31	N	**Kothari**, N. L., *Colliery Manager.* c/o Messrs. K. Worah & Co., Jharia, Manbhum.
1-3-26	R	**Kramrisch**, STELLA (MISS), PH.D., *Lecturer in Ancient Indian History (Fine Arts), Calcutta University.* 57, Ballygunge Circular Road, Calcutta.
2-4-28	R	**Kumar**, KUMAR KRISHNA, M.A., B.L., *Zemindar and Banker.* 31 & 31-1, Burtolla Street, Calcutta.

Date of Election.		
4-11-29	N	**Kurup**, Pokiarath Chencheri Krishna, L.M.P., *Licentiate of the College of Physicians and Surgeons of Bombay, Medical Officer.* Taliparamba P.O., North Malabar (M.P.).
7-3-23	R	**Labey**, George Thomas, M.C., *Bengal Pilot Service.* United Service Club, Calcutta.
1-4-25	N	**Laden La**, Sonam Wangfel, Sardar Bahadur, O.B.E., F.R.G.S., *Hony. A.D.C. to H.E. the Governor of Bengal, Chief of Police, Lhassa, Tibet.* "Yangang Villa", Darjeeling.
3-6-25	N	**Lal**, Budh Behari, Rai Saheb, B.A., PH.D., *Head Master.* 48B, New Mandi, Muzzaffarnagar.
6-3-89	L	***La Touche**, Thomas Henry Digges, M.A., F.G.S., F.A.S.B. 230, Hills Road, Cambridge, England.
5-8-14	R	**Law**, Bimala Charan, M.A., B.L., PH.D., F.R.HIST.S. 43, Kailas Bose Street, Calcutta.
1-2-11	R	**Law**, Narendra Nath, M.A., B.L., P.R.S., PH.D. 96, Amherst Street, Calcutta.
1-7-14	R	**Law**, Satya Churn, M.A., B.L., PH.D., F.Z.S., M.B.O.U. 50, Kailas Bose Street, Calcutta.
7-6-26	R	**Lemmon**, Richard Dennis, *Merchant.* 8, Waterloo Street, Calcutta.
3-5-11	R	**Lomax**, C. E., M.A. La Martinière. Calcutta.
1-6-31	R	**Lort-Williams**, The Hon'ble Mr. Justice John, K.C., *Barrister-at-Law, Judge, High Court.* 24, Alipur Park South, Calcutta.
4-3-29	R	**Lunan**, A. G., *Partner, Messrs. Bathgate & Co.* 19, Old Court House Street, Calcutta.
5-7-26	N	**Lyne**, Howard William, I.C.S. Khulna, E.B.R.
2-8-05	L	***McCay**, David, LT.-COL., I.M.S., M.D., B.CH., B.A.O., M.R.C.P., F.A.S.B. c/o The Standard Bank of S. Africa, Cradock, Cape Province, S. Africa.
1-3-26	R	**McKay**, John Wallace, *Delegate, Chilean Nitrate Committee (Indian Delegation).* 7, Hare Street, Calcutta.
11-1-93	L	***Maclagan**, Sir Edward Douglas, K.C.S.I., K.C.I.E., F.A.S.B. 188, West Hill, Putney, London, S.W. 15.
6-1-30	R	**McNair**, George Burgh, *Solicitor, Messrs. Morgan & Co.* 5, Harington Street, Calcutta.
5-3-24	R	**McPherson**, James. c/o Messrs. Begg Dunlop & Co., Ltd., 2, Hare Street, Calcutta.
7-6-16	N	**Mahajan**, Surya Prasad. Murarpur, Gaya.
3-3-20	R	**Mahalanobis**, P. C., M.A., B.SC., I.E.S., *Professor, Presidency College.* 210, Cornwallis Street, Calcutta.
5-12-06	R	**Mahalanobis**, Subodh Chandra, B.SC. (Edin.), F.R.S.E., I.E.S., *Late Professor, Presidency College.* P-45, New Park Street, Calcutta.
1-3-11	F	**Mahtab**, Sir Bijay Chand, K.C.S.I., I.O.M., Maharajadhiraja Bahadur of Burdwan. 6, Alipur Lane, Calcutta.
3-2-30	N	**Mahtab**, Uday Chand, *Maharaj Kumar of Burdwan.* The Palace, Burdwan.
6-2-24	R	**Mahindra**, K. C., B.A. (Cantab.). Messrs. Martin & Co., 12, Mission Row, Calcutta.
7-7-30	R	**Mahudavala**, Jehangir J., B.COM. (Birmingham), *Insurance Representative.* 2-B, Camac Street, Calcutta.
7-8-18	R	**Maitra**, Jatindra Nath, *Physician and Surgeon.* 68/A, Beadon Street, Calcutta.

Date of Election.		
2-8-26	N	**Majumdar,** Dhirendra Nath, m.a., *Lecturer in Anthropology.* University of Lucknow, Lucknow.
2-2-16	R	**Majumdar,** Narendra Kumar, m.a., *Professor, Calcutta University.* 18, Jhamapukur Lane, Mechuabazar, Calcutta.
4-6-13	N	**Majumdar,** Ramesh Chandra, m.a., ph.d., *Professor, Dacca University.* Ramna, Dacca.
5-5-30	N	**Mallam,** G. L., Captain, *Census Superintendent.* Peshawar, N.-W.F.P.
6-2-28	R	**Mallik,** S. N., c.i.e., m.a., b.l., *Formerly Member, India Council, India Office, London.* 2, Chandranath Chatterji Street, Calcutta.
7-5-28	R	**Mallik,** The Hon'ble Mr. Justice Satyendra Chandra, m.a., i.c.s., *Judge, High Court.* 7-3, Burdwan Road, Alipur, Calcutta.
4-11-29	R	**Mallya,** Bantwal Ganapathy, i.m.s., f.r.c.s.e., 10-4, Elgin Road, Calcutta.
6-2-18	L	***Manen,** Johan van, c.i.e., f.a.s.b. 6, Temple Chambers, 6, Old Post Office Street, Calcutta.
5-6-01	F	**Mann,** Harold Hart, d.sc., m.sc., f.i.c., f.l.s., Woburn Experimental Station, Aspley Guise, Bedfordshire, England.
6-1-30	N	**Martin,** M. F. C., Capt., r.e. Office of C.R.E., Waziristan District, Dera Ismail Khan.
5-3-24	R	**Martin,** T. Leslie, m.a. (Cantab.). 12, Mission Row, Calcutta.
4-6-19	N	**Matthai,** George, m.a., sc.d. (Cantab.), f.r.s.e., f.l.s., f.z.s., i.e.s., *Professor of Zoology.* Government College, Lahore.
5-5-30	R	**Matthias,** Owen Gardiner, *Managing Director, Messrs. Smith Stanistreet & Co., Ld.* Stanistreet House, 18, Convent Road, Entally, Calcutta.
2-12-29	N	**Maynard,** The Rev. Bertram Martin (*King's College, London*), *Chaplain.* Cawnpore, U.P.
2-1-28	N	**Mehta,** M. H., *Managing Director, M.T. Ltd.* 15, Chowringhee Place, Calcutta.
5-3-28	N	**Melhuish,** Robert Aveline, Commander, r.i.m., *Surveyor-in-Charge, Marine Survey of India.* c/o R.I.M. Dockyard, Bombay.
2-1-28	N	**Mello,** Froilano de, Colonel, *Director-General of Medical Services in Portuguese India, Professor of Parasitology.* Nova Gôa.
5-11-84	L	***Middlemiss,** Charles Stewart, c.i.e., f.r.s., b.a., f.g.s., f.a.s.b. Aviemore, Crowborough, Sussex, England.
1-2-26	N	***Mills,** James Philip, i.c.s., m a. (Oxon.), j.p , f.a.s.b., *Deputy Commissioner, Kohima.* Naga Hills, Assam.
5-6-12	N	**Misra,** Champaram, b.a., *Dy. Director of Industries.* Cawnpore, U.P.
2-4-24	R	**Mitra,** J. C., m.a., b.l., *Retired Accountant-General, Bengal.* 1, Abinash Mitter Lane, Calcutta.
4-3-29	R	**Mitra,** Jamini Mohan, Rai Bahadur, m.a., *Registrar, Co-operative Societies, Bengal.* 24, Ray Street, Bhawanipore, Calcutta.
6-6-06	R	**Mitra,** Kumar Manmatha Nath. 34, Shampukur Street, Calcutta.
4-11-29	R	**Mitra,** Mathura Nath, b.a., *Solicitor.* 12-1, Old Post Office Street, Calcutta.
6-8-28	R	**Mitra,** Subodh, m.d. (Berlin), m.b. (Cal.), f.r.c.s. (Edin.). 148, Russa Road, Bhawanipore, Calcutta.

Date of Election.		
5-3-24	N	**Mitter,** The Hon'ble Sir B. L., kt., m.a., b.l., *Barrister-at-Law, Law Member, Viceroy's Council.* New Delhi.
5-3-24	R	**Mitter,** Dwarkanath, m.a., d.l., *Judge, High Court.* 12, Theatre Road, Calcutta.
4-3-29	R	**Mitter,** Hiranya Kumar, *Landholder.* 1, Jhamapukur Lane, Amherst Street P.O., Calcutta.
5-4-26	R	**Mitter,** Khagendra Nath, m.a., *Professor, Presidency College.* 10, Dover Lane, Ballygunge, Calcutta.
5-4-26	R	**Mitter,** Kumar Krishna, *Merchant and Landlord.* 14, Ahiritolla Street, Calcutta.
5-3-24	R	**Mitter,** The Hon'ble Sir Provash Chandra, kt., c.i.e., m.l.c. 34/1, Elgin Road, Calcutta.
1-11-26	R	**Modi,** Jal R. K., b.a. 4, Camac Street, Calcutta.
1-4-25	A	**Mohomed,** Ismail Abdullah, *Merchant.* 21, Amratolla Lane, Calcutta.
7-5-28	N	**Moledina,** Mohamed Hashimi, *Landlord and Merchant.* 30, Main Street, Camp Poona.
2-5-23	A	**Möller,** H. P., *Merchant.* 18, Ballygunge Circular Road, Calcutta.
6-8-24	N	**Moloney,** William J., *General Manager of Reuter's for the East.* c/o 26/7, Dalhousie Square, Calcutta.
2-4-28	R	**Mookerjea,** Bhabadeb, *Merchant.* 48, Barrackpore Trunk Road, P.O. Baranagore.
1-3-26	R	**Mookerjee,** Aditya Nath, m.a., ph.d., *Late Principal, Sanskrit College.* 10/B, Mohun Lal Street, Shambazar, Calcutta.
5-11-24	R	**Mookerjee,** B. N., b.a. (Cantab.), *Engineer.* 12, Mission Row, Calcutta.
3-12-24	R	**Mookerjee,** J. N., *Civil Engineer.* 12, Mission Row, Calcutta.
1-3-26	R	**Mookerjee,** Satish Chandra, *Barrister-at-Law.* 7, Ballygunge Circular Road, Calcutta.
3-5-98	L	***Mookerjee,** Sir Rajendra Nath, k.c.i.e., k.c.v.o., hon. f.a.s.b. 7, Harington Street, Calcutta.
2-7-24	R	**Mookerjee,** Syama Prasad, m.a., b.l., *Vakil, High Court, Fellow of the University of Calcutta.* 77, Russa Road North, Calcutta.
2-2-21	N	**Mukerjee,** Subodh Chandra, Shastri, m.a., Docteur-es-Lettres (Paris), Office of the Chief Auditor, N.W.R. Workshop Audit Branch, Moghalpura, Lahore.
5-12-27	R	**Mukerjee,** Susil Kumar, f.r.c.s. (Edin.), d.o. (Oxon), d.o.m.s. (Lond.), *Ophthalmic Surgeon, Carmichael Medical College Hospitals.* 1/1, Wood Street, Calcutta.
6-2-28	R	**Mukerji,** Manmatha Nath, m.a., b.l., *Judge, High Court.* 8/1, Harsi Street, Calcutta.
5-3-24	R	**Mukerji,** S., m.a., b.l., *Vakil and Zemindar.* 7, Old Ballygunge Road, Calcutta.
3-3-30	N	**Mukharji,** Isan Chandra, *Rai Bahadur, Tazimi Sardar and Retired Member of Jaipur Council.* Jaipur, Rajputana.
7-11-27	N	**Mukherjee,** Devaprosanna, m.a., b.l., *Zemindar.* Burdwan.
7-2-27	R	**Mukherjee,** Harendra Nath, b.sc., m.b. (Cal.), d.i.c. (Lond.), *Medical Practitioner.* Biochemical Department, Carmichael Medical College, Belgachia, Calcutta.
2-8-26	R	**Mukherjee,** Jnanendra Nath, d.sc. (London), f.c.s. (London), *Fellow of the Indian Chemical Society; Guruprasad Professor of Chemistry, University of Calcutta.* 92, Upper Circular Road, Calcutta.

Date of Election.		
5-2-08	R	*__Mukhopadhyaya__, Girindra Nath, Bhisagacharya, B.A., M.D., F.A.S.B. 156, Haris Mukerjee Road (North), Bhawanipur, Calcutta.
5-7-26	R	**Mukhopadhyaya**, Prabhat Kumar, M.A., *Research Assistant, Calcutta University.* 27, Govinda Ghosal Lane, Bhawanipur, Calcutta.
2-2-21	R	**Mukhopadhyaya**, The Hon'ble Ramaprasad, M.A., B.L. 77, Russa Road North, Bhawanipore, Calcutta.
2-4-28	R	**Mullick**, Kartick Churn, Kumar, *Director, Raja D. N. Mullick & Sons, Ltd* Colootola Rajbati, Chittaranjan Avenue, Calcutta.
4-3-29	R	**Mullick**, Pramatha Nath, Rai Bahadur, *Zemindar and Landholder.* 129, Cornwallis Street, Calcutta.
7-5-28	N	**Murray**, Eugene Florian Oliphant, A.I.M.M., *Mining Geologist and Engineer.* Tatanagar, B.N.Ry.
4-1-26	N	**Murray**, Howard, C.I.E., Lt.-Col., Indian Army, *Deputy Financial Adviser.* Flashman's Hotel, Rawalpindi.
3-6-25	N	**Musa**, Muhammad, Moulvi, Khan Bahadur, M.A., *Principal, Chittagong Madrasah.* Madrasah Hill, Chittagong.
1-6-21	N	**Muzammil-Ullah Khan**, Mohd., Hon'ble Nawab, Khan Bahadur, O.B.E., *Rais.* Bhikanpur, Dist. Aligarh, U.P.
7-3-06	N	**Nahar**, Puran Chand, Rai Bahadur, *Solicitor.* c/o 48, Indian Mirror Street, Calcutta.
5-12-27	L	**Namgyal**, H.H. Maharaja Sir Tashi, K.C.I.E., *Maharaja of Sikkim.* Gangtok, Sikkim.
6-6-27	N	**Nandi**, Maharaja Sris Chandra, M.A., M.L.C., *Zemindar.* Kasimbazar Rajbari, Kasimbazar, Murshidabad.
4-2-29	N	**Narain**, Hirde, M.A., B.T., *Professor of History, Morris College.* Nagpur, C.P.
4-6-28	N	**Narasimham**, Yechuri, M.A., *Dewan, Vizianagram Samsthanam.* Vizianagram.
7-12-26	R	**Narayanaswami**, V., M.A. Royal Botanical Garden, Sibpur, Howrah.
5-3-28	R	**Neogi**, Panchanan, M.A., Ph.D., I.E.S., *Professor of Chemistry, Presidency College.* 21, Kundu Lane, Belgachia, Calcutta.
3-11-30	R	**Newman**, Carl Damien, M.B.B.S., D.T.M. & H., *District Medical Officer, E.B.Ry.* 1/1, Old Ballygunge Road, Calcutta.
3-12-24	N	**Newman**, Chas. F., F.R.G.S., M.C.P. Kutcha Bungalow, Bhopal, C.I.
6-8-24	R	**Nyss**, Wm. B. S., *Superintendent, Excise and Salt.* 175B, Lower Circular Road, Calcutta.
7-4-15	F	**Ohtani**, Count Kozui. San-ya-so, Edomachi, Fushimi, Kyoto, Japan.
5-11-28	R	**Olpadvala**, E. S. 1, Corporation Street, Calcutta.
2-6-30	R	**Oyevaar**, J. J., *Vice-Consul for the Netherlands.* c/o The Java Bengal Line, E-1, Clive Buildings, Clive Street (Post Box No. 71), Calcutta.
5-12-23	N	**Pande**, Shiva Bandhan, *Retired Tahsildar and Zemindar.* Ramaipatti, Mirzapur, U.P.
5-4-26	N	**Parker**, Richard Henry, I.C.S., *late Scholar of St. John's College, Oxford; Officiating Under Secretary to the Resident at Hyderabad.* Hyderabad, Deccan.

Date of Election.		
4-11-29	A	**Parry,** Nevill Edward, I.C.S., *Deputy Commissioner, Garo Hills, Tura.* Garo Hills, Assam.
5-11-19	A	***Pascoe,** Sir Edwin Hall, Kt., M.A., Sc.D. (Cantab.), D.Sc. (Lond.), F.G.S., F.A.S.B., *Director, Geological Survey of India.* Indian Museum, Calcutta.
6-5-29	N	**Pawsey,** C. R., *Indian Civil Service.* Mokokchung, Naga Hills, Assam.
6-6-88	L	**Pennell,** Aubray Percival, B.A., *Barrister-at-Law.* Lamb's Building, Temple, London, E.C. 4.
1-4-25	R	**Perier,** Ferdinand, S.J., *The Most Reverend Archbishop of Calcutta.* 32, Park Street, Calcutta.
7-4-30	N	**Pessein,** Rev. J. F., *Catholic Missionary, Superior of the Catholic Missionary Sanatorium,* Wellington, Nilgiris.
3-2-30	N	**Pettigrew,** The Rev. William, *Missionary.* American Baptist Foreign Mission Society, P.O. Kangpokpi, Manipur, Assam.
1-6-04	A	***Pilgrim,** Guy E., D.Sc., F.G.S., F.A.S.B. Geological Survey of India, Indian Museum, Calcutta.
7-1-29	R	**Pillai,** G. P., *Entomologist, The Lister Antiseptics and Dressing Co. (1928), Ld.* 14, Hare Street, Calcutta.
5-3-28	A	**Plessen,** Baron Leopold, *Acting Consul-General for Germany.* 2, Store Road, Ballygunge, Calcutta.
4-8-30	R	**Popper,** Stephen W., *Merchant.* c/o Messrs Havero Trading Co., Ltd., Commercial House, 15, Clive Street, Calcutta.
6-4-31	N	**Prasad,** Sharda. c/o Messrs. Gopinath Lal Behari, Satna.
3-4-18	L	***Prashad,** Baini, D.Sc., F.Z.S., F.R.S.E., F.A.S.B. Zoological Survey of India, Indian Museum, Calcutta.
3-8-25	R	**Pruthi,** Hem Singh, M.Sc. (Punjab), Ph.D. (London), *Assistant Superintendent, Zoological Survey of India.* Indian Museum, Calcutta.
1-11-26	N	**Pugh,** Lewis Pugh Evans, B.A. (Oxon), *Barrister-at-Law.* Patna High Court, Patna.
2-1-28	N	**Puri,** I. M., Ph.D. (Cantab.), M.Sc. (Punjab). Central Research Institute, Kasauli, Punjab.
3-12-24	R	**Pushong,** E. S., M.D., L.S.A., *Medical Practitioner.* 1, Wood Street, Calcutta.
5-11-28	R	**Rahman,** Nawabzada A. S. M. Latifur, M.A. (Cantab.), *Barrister-at-Law, Judge, Presidency Court of Small Causes.* 10, Turner Street, Calcutta.
3-11-30	R	**Rahman,** Shah Kalimur, M.A., *Lecturer in Arabic and Persian, Calcutta University.* 8, Golam Sovan Lane, Calcutta.
7-4-80	N	**Rai,** Vepin Chandra. Giridih, Chota Nagpur.
6-2-28	N	**Rai,** Lakshmi Narain, L.M.S. (Calcutta), *Civil Assistant Surgeon.* Benares.
1-2-22	R	***Raman,** Sir Chandrasekhara Venkata, Kt., M.A., D.Sc., F.R.S., F.A.S.B. 210, Bowbazar Street, Calcutta.
1-11-26	N	**Ramanujaswami,** P. V., M.A., *Principal, Maharaja's Sanskrit College.* Vizianagaram.
7-3-27	R	**Rankin,** The Hon'ble Sir George, Kt., *Chief Justice of Bengal.* 9, Camac Street, Calcutta.
6-12-26	N	**Rao,** A. Subba, B.A., D.Sc., F.R.M.S., *Professor of Physiology and Embryology.* Medical College, Bangalore.
3-12-24	R	**Rao,** H. Srinivasa, M.A., D.Sc., *Assistant Superintendent, Zoological Survey of India.* Indian Museum, Calcutta.
6-5-25	R	**Rao,** M. Vinayak, Rao Bahadur, B.A., F.G.S., *Assistant Superintendent, Geological Survey of India.* Indian Museum, Calcutta.

Date of Election.		
1-2-26	N	**Rao**, Y. Ramachandra, Rao Sahib, M.A., F.E.S., *Government Entomologist, Agricultural Research Institute.* Lawley Road, Coimbatore.
4-8-30	N	**Raparia**, Tara Chand, B.A., *Business Manager.* c/o Messrs. Bansidhar Sumerchand & Co., Belangunj, Agra, U.P.
3-4-18	N	**Ratnakar**, Jagannath Das, B.A., Kavisudhakar. Shivalaghat, Benares City.
2-7-24	N	**Ray**, Abinash Chandra, B.A. R.M.H.E. School, P.O. Deoghar, E.I.R.
2-7-24	R	**Ray**, Bhabendra Chandra, *Zemindar.* 6, Short Street, Calcutta.
7-9-21	R	**Ray**, Hem Chandra, M.A., PH.D. (London). P 39A, Manicktolla Spur, Calcutta.
5-1-21	N	**Ray**, Jagadisnath, Maharaja, *Maharaja of Dinajpore.* Dinajpore.
5-3-90	R	***Ray**, Sir Profulla Chandra, KT., C.I.E., D.SC., F.A.S.B. University College of Science, 92, Upper Circular Road, Calcutta.
5-11-28	L	**Reinhart**, Werner, *Merchant.* c/o Messrs. Volkart Bros., Rychenberg, Winterthur, Switzerland.
6-2-28	R	**Reneman**, Nico. 52/1, Ballygunge Circular Road, Calcutta.
2-4-24	F	**Richards**, F. J., I.C.S. 6, Lexham Gardens, London, W. 8.
1 4-29	N	**Rizvi**, Syed Hamid Husain, *Excise Sub-Inspector.* Mohalla Sanechri, Near Musjid of Munshi Sk Ghassu, Saugor, C.P.
3-12-24	L	**Roerich**, George Nicholas, M.A., M.R.A.S., *Orientalist.* 310, Riverside Drive, New York, U.S.A.
2-7-28	L	**Roerich**, Nicholas, *Professor, Honorary President, Master Institute of United Arts, New York, U.S.A., Artist-Painter.* 310, Riverside Drive, New York, U.S.A.
3-12-24	N	**Rogers**, T. E., *Tea Planter.* Nagadhoolie Tea Estate, Mariani, Assam.
7-5-24	A	**Rose**, G. F., *Director, Messrs. Andrew Yule & Co., Ltd.* 8, Clive Row, Calcutta.
4-12-01	F	***Ross**, Sir Edward Denison, KT., C.I.E., PH.D., F.A.S.B., *Director, School of Oriental Studies.* Finsbury Circus, London, E.C. 2.
6-12-26	R	**Roy**, The Hon'ble Mr. Justice A. K., *Barrister-at-Law, Judge, High Court.* 3, Upper Wood Street, P.O. Theatre Road, Calcutta.
1-12-30	N	**Roy**, Kumar Kamalranjan, B.A., *Zemindar.* Kashimbazar Post, Dt. Murshidabad.
2-4-28	N	**Roy**, Suhrid Kumar, B.SC., PH.D., F.G.S., *Professor of Geology, Indian School of Mines.* Dhanbad.
7-7-20	R	**Roy-Chaudhuri**, Hem Chandra, M.A., PH.D. 28, Gopal Bose Lane, Jhamapukur, Calcutta.
6-8-24	R	**Roy-Chowdhury**, Brajendra Kishore, *Zemindar.* 53, Sukea Street, Calcutta.
1-2-26	N	**Ruthnaswamy**, M., M.A., *Barrister-at-Law, Principal, Law College.* Esplanade, Madras.
7-5-28	N	***Saha**, Megh Nad, D.SC., F.R.S., F.A.S.B., *Professor of Physics, University of Allahabad.* Katra, Allahabad.
3-11-30	N	**Sahaya**, Shyamnandan, B.A., *Businessman, Agent, New India Assurance Co., Ltd., Bombay, and Agent, The National Banking and Loan Co., Ltd., Calcutta.* Bank Road, Patna.

Date of Election.		
5-11-24	N	***Sahni**, B., M.A., SC.D. (Cantab.), D.SC., F.G.S., F.A.S.B., *Professor of Botany*. The University, Lucknow.
6-5-29	R	**Sanyal**, Srish Chandra, *Astronomer*. 25, Rani Branch Road, P.O. Cossipur, Calcutta.
3-12-24	R	**Sarkar**, C. K., C.E., *Engineer and Architect*. 10, Hastings Street, Calcutta.
3-3-09	R	**Sarvadhikary**, Sir Devaprasad, KT., C.I.E., O.B.E., C.B.E., M.A., B.L., F.C.U., LL.D. (Aberdeen), LL.D. (St. Andrews), Suriratna, Vidyaratnakar, Jnanasindhu. 20, Suri Lane, Entally, Calcutta.
6-5-29	N	**Sastri**, D. S. Balasubramaniya, *Bhashachatushtaya Pandita (Passed Nyaya Mimansa Siromoni Class in 1913), Telugu Pandit, Borstal School, Tanjore*. Borstal Teachers' Lines, Tanjore.
1-4-25	R	**Sen**, Benoy Chandra, M.A., *Professor of History, City College*. 7, Bishwakosh Lane, Baghbazar, Calcutta.
3-12-24	R	**Sen**, H. K., M.A., D.SC. (London), D.I.C., *Professor of Chemistry, University College of Science*. 92, Upper Circular Road, Calcutta.
5-12-23	L	**Sen**, Lakshman, H.H. Raja of Suket. Suket State, Punjab.
3-6-29	R	**Sen**, Prabodh Chandra, M.A., *Research Assistant, Calcutta University*. 12, Radhanath Mallik Lane, Calcutta.
1-4-29	R	**Sen-Gupta**, Nares Chandra, M.A., D.L., *Advocate, High Court*. 128-B, Justice Chandra Madhab Road, Bhawanipore, Calcutta.
5-4-26	R	**Senior-White**, Ronald, F.E.S., F.R.S.T.M. & H., *Malariologist*. B. N. Ry. House, Kidderpore, Calcutta.
1-12-97	R	**Seth**, Mesrovb Jacob, M.R.A.S., M.S.A., F.R.S.A., *Examiner in Classical Armenian to the Calcutta University*. 13, Elliott Road, Calcutta.
1-2-26	N	**Setna**, S. B., M.SC., *Lecturer*. The Royal Institute of Science, Bombay.
5-7-11	L	***Sewell**, Robert Beresford Seymour, M.A., SC.D. (Cantab.), M.R.C.S., L.R.C.P., F.Z.S., F.L.S., F.A.S.B., LT.-COL., I.M.S., *Director, Zoological Survey of India*. Indian Museum, Calcutta.
2-11-25	N	**Sharif**, Mohammad, D.SC., F.R.M.S., F.L.S., *Lecturer in Zoology*. Muslim University, Aligarh.
6-5-29	N	**Sharma**, Sri Ram, M.A., M.R.A.S., M.A.O.S., *Professor of History*. D.A.-V. College, Lahore.
2-4-28	A	**Shaw**, Edward Brian, M.A. (Cambridge), I.C.S. Nowgong, Assam.
2-5-23	N	**Shebbeare**, E. O., Conservator of Forests, Darjeeling.
6-1-09	N	**Shirreff**, Alexander Grierson, B.A., I.C.S. Sitapur, U.P.
4-1-26	R	**Shortt**, H. E., LT.-COL., I.M.S., *Director, Kala-Azar Commission*. Golaghat, Assam.
5-1-31	N	**Shukla**, Jagannath Prasad. Trans Gomti Outram Road, near Badshahnagar, Railway Station, Lucknow.
6-2-28	L	**Shumsher** Jung Bahadur Rana, Sir Kaiser, K.B.E., Supradipta Manyavara, Lieut.-General, *Nepalese Army*. Kaiser Mahal, Kathmandu, Nepal.
5-2-02	N	**Shyam Lal**, Lala, M.A., LL.B. Nawabganj, Cawnpore, U.P.
1-4-25	R	**Sidiq**, Syed Mohammad, Shifa-ul-Mulk, *Unani Physician*. 11, Harin Bari 1st Lane, Calcutta.
3-12-24	N	**Siddiqi**, A., M.A. (Allahabad), PH.D. (Göttingen), *Professor of Arabic and Islamic Studies*. University of Allahabad, Allahabad.

Date of Election.		
4-11-29	R	**Siddiqi**, Mohammad Zubayr, *Sir Asutosh Professor of Islamic Culture, Calcutta University.* 28/1, Jhautolla Road, Park Circus, Calcutta.
5-3-13	L	***Simonsen**, John Lionel, D.SC., F.I.C., F.A.S.B. 16/36, University College of North Wales, Bangor, North Wales.
6-2-18	N	**Singh**, Badakaji Marichi Man. 38, Khichapokhari, Kathmandu, Nepal.
4-11-29	R	**Singh**, Jaipal, M.A., (*Modern Greats*), *St. John's College, Oxford University, Executive Assistant, Burmah-Shell.* Calcutta.
7-4-09	N	**Singh**, Prithwipal, Raja, F.R.G.S., F.R.S.A., F.T.S., *Talukdar of Surajpur.* Chandrahas Palace, Hathaunda, Barabanki, Oudh.
7-2-94	N	**Singh**, Vishwa Nath, H.H. The Maharaja Bahadur. Chhatturpur, Bundelkhund.
5-9-12	N	**Singhi**, Bahadur Singh. Azimganj, Murshidabad.
3-4-18	N	**Sinha**, Bhupendra Narayan, Raja Bahadur, B.A. Nashipur Rajbati, Nashipur.
7-5-28	F	**Sinha**, Lord, of Raipur. Queen Anne Mansions, St. James Park, London.
6-6-27	N	**Sinha**, Sheonandan Prasad, M.B., *Assistant Surgeon.* Chatra, Dt. Hazaribagh.
6-2-28	R	**Sinha**, Suhrid Chandra, Kumar, M.SC. 15/1/1, Ramakanto Bose Street, Bagh Bazar, Calcutta.
4-1-26	N	**Sinton**, J. A., O.B.E., Major, I.M.S., V.C., *Officer-in-Charge, Malaria Bureau.* Central Research Institute, Kasauli.
5-7-16	L	**Sircar**, Ganapati, Vidyaratna. 69, Beliaghatta Main Road, Calcutta.
5-3-24	R	**Sircar**, N. N., M.A., B.L., *Barrister-at-Law.* 36/1, Elgin Road, Calcutta.
5-3-24	R	**Sircar**, Sir Nil Ratan, KT., M.A., M.D., *Physician.* 7, Short Street, Calcutta.
2-6-20	A	**Skinner**, S. A., *Engineer and Director, Messrs. Jessop & Co., Ltd.* 93, Clive Street, Calcutta.
1-3-26	R	**Snaith**, John Frank, *Managing Director, Messrs. Hamilton & Co.* 8, Old Court House Street, Calcutta.
2-8-26	R	**Sohoni**, Vishvanath Vishnu, B.A., B.SC., *Meteorologist.* The Observatory, Alipore, Calcutta.
5-8-29	A	**Sommerfeld**, Alfred, *Merchant.* 5, Ballygunge Park, Calcutta.
4-2-29	R	**Srimani**, Joggeswar, L.M.S., *Zemindar and Medical Practitioner.* Chandernagore, E.I.R.
7-3-27	R	**Stagg**, M., LT.-COL., R.E., O.B.E., *Master, H.M.'s Mint.* Strand Road, Calcutta.
7-3-23	F	**Stamp**, L. Dudley, B.A., D.SC. University of London, London School of Economics, Houghton Street, London, W.C. 2.
4-1-26	N	**Stapleton**, Grace (Miss), M.D., B.S. (London). Government Caste and Gosha Hospital, Triplicane, Madras.
28-9-04	L	***Stapleton**, Henry Ernest, M.A., B.SC., I.E.S., F.A.S.B., *Director of Public Instruction, Bengal.* 8, Galstaun Mansions, Calcutta.
5-11-28	N	**Statham**, R. M., C.I.E., B.A., I.E.S., *Principal, Presidency College.* Madras Club, Madras.
6-5-25	R	**Staub**, Max, *Consul for Switzerland.* 100, Clive Street, Calcutta.
1-8-23	A	**Stow**, Sir Alexander Montagu, K.C.I.E., O.B.E., M.A. (Cantab.), I.C.S., *Chief Commissioner.* Delhi.

Date of Election.		
1-11-22	R	**Strickland-Anderson,** (Mrs.). 1, Alipur Park, Calcutta.
5-6-07	R	***Suhrawardy,** Sir Abdullah Al-Ma'mun, Iftikharul Millat, Kt., M.A., *Barrister-at-Law,* D.Litt., LL.D., F.A.S.B. 56, Mirzapur Street, Calcutta.
2-6-20	R	**Suhrawardy,** Hassan, Lt.-Col., M.D., F.R.C.S., I.T.F.M.C., *Chief Medical Officer, E.B. Ry.* 2, Belvedere Park, Alipur, Calcutta.
4-4-27	R	**Suhrawardy,** Sir Z. R. Z., Kt., *Late Judge, High Court.* 61, Ripon Street, Calcutta.
3-3-20	N	**Sundararaj,** Bunguru, M.A., Ph.D., *Director of Fisheries.* Madras.
4-1-26	R	**Sur,** S. N., M.B., D.P.H., D.T.M., *Assistant Director of Public Health.* Writers' Buildings, Calcutta.
7-4-30	N	**Swami,** Vidya Nand. Jasdan State, Kathiawad.
2-7-28	R	**Tagore,** Ranendra Mohon, *Zemindar.* 6, Alipore Park Road East, Calcutta.
6-4-98	R	**Tagore,** Sir Pradyot Coomar, Kt., Maharaja Bahadur. "Emerald Bower", 56, Barrackpore Trunk Road, 24-Pergs.
7-11-27	R	**Tarkatirtha,** Bimalananda, *Kaviraj, Punditbhusan, Byakaranatirtha.* 90/3, Grey Street, Calcutta.
31-8-93	L	**Tate,** George Passman. 56, Cantonment, Bareilly, U.P.
2-12-29	R	**Thomas,** H. W., F.C.S., M.P.S., *Senior Partner and Chairman of the Managing Directors, Messrs. Smith Stanistreet & Co.* Stanistreet House, 18, Convent Road, Entally, Calcutta.
4-8-09	N	**Thompson,** Sir John Perronet, K.C.I.E., C.S.I., M.A., I.C.S., *Chief Secretary, Government of the Punjab.* United Service Club, Simla.
1-6-04	L	***Tipper,** George Howlett, M.A., F.G.S., M.Inst.M.M., F.A.S.B. "The Laurels", Glebe Road, Cambridge, England.
4-3-29	N	**Titus,** Rev. Murray T., Ph.D., D.D., *Missionary of the Methodist Episcopal Church.* Budaun, U.P.
4-3-29	N	**Travers,** Sir Walter Lancelot, Kt., C.I.E., O.B.E., M.L.C., *Tea Planter, Baradighi Tea Estate.* Baradighi P.O., B.D.R., Jalpaiguri.
7-5-28	F	**Tucci,** Guiseppe, Ph.D., *Late Professor of Religions and Philosophy of India and the Far East, University of Rome; Professor of Chinese, University of Naples.* Naples, Italy.
5-7-26	F	**Tyson,** John Dawson, I.C.S. *Private Secretary to H.E. The Governor of Bengal.* Government House, Calcutta.
6-5-25	R	**Ukil,** Amulya Chandra, M.B. (Cal.), *Professor of Bacteriology, National Medical Institute, and Assistant Director, Clinical Research Association.* 6/1, Kanklia Road, Ballygunge, Calcutta.
6-8-28	R	**Urchs,** Oswald, M.D. c/o Messrs. Havero Trading Co., Ld., 15, Clive Street (Post Box 2122), Calcutta.
7-3-27	R	**Urquhart,** Rev. W. S., M.A., D.D., D.Litt., *Principal, Scottish Churches College.* 3 & 4, Cornwallis Square, Calcutta.
4-7-27	A	**Vance,** R. L., M.B., Major, *Indian Medical Service.* Gyantse, Tibet.
5-7-05	R	**Vidyabhusana,** Amulya Charan. 28A, Telepara Lane, Calcutta.

Date of Election.		
6-3-01	L	***Vogel**, Jean Philippe, litt.d., f.a.s.b. The University, Lieden, Holland.
27-9-94	L	**Vost**, William, lt.-col., i.m.s. Leicester Lodge, 1, Medina Villas, Hove, Sussex, England.
6-5-25	R	**Wadia**, D. N., m.a., b.sc., f.r.g.s., f.g.s., *Geological Survey of India.* Indian Museum, Calcutta.
5-3-28	N	**Waight**, Harry George, b.a. (Oxon. and Lond.), f.r.g.s., i.c.s., *District Judge*, Jalpaiguri.
7-3-27	A	**Ward**, Dorothy (Mrs.). c/o J. Dickinson & Co., Ld., P.O. Box No. 45, Calcutta.
2-1-28	N	**Wats**, R. C., Major, m.d., d.p.h., d.t.m., i.m.s. Mhow, Indore, C.I.
2-5-27	R	**Watson**, Alfred Henry, *Journalist.* c/o The "Statesman," Calcutta.
2-2-31	R	**Wauchope**, R. S., o.b.e., a.i.c.e., f.r.a.i., i.a., major, *Assistant Surveyor-General, Survey of India.* 13, Wood Street, Calcutta.
1-11-26	R	**Westcott**, Foss, The Most Reverend, d.d. (Cantab.), honorary d.d. (Oxon.), *Lord Bishop of Calcutta and Metropolitan of India, Burma and Ceylon.* Bishop's House, 51, Chowringhee, Calcutta.
19-9-06	L	***Whitehead**, Richard Bertram, f.a.s.b., i.c.s. (retd.). 30, Millington Road, Cambridge, England.
6-5-29	N	**Williams**, Henry French Fulford, m.a., Clare College (Camb.), *Chaplain.* Shillong, Assam.
6-2-28	F	**Williams**, T. Taliesin, m.a., b.sc. 2, Orchard, Welwyn Garden City, Herts., England.
6-12-26	F	**Winfield**, Walter Warren, b.a., b.d., *Missionary.* c/o Baptist Missionary Society, 19, Furnival Street, London, E.C. 4, England.
7-3-06	L	***Woolner**, Alfred Cooper, c.i.e., m.a., f.a.s.b. 53, Lawrence Road, Lahore.
1-4-08	R	**Wordsworth**, William Christopher, m.a., i.e.s. (Retd.). c/o The "Statesman", 6, Chowringhee, Calcutta.
7-3-27	R	**Wright**, Frederic Maitland, *Broker.* 2-5, Lansdowne Road, Calcutta.
5-2-19	N	**Yazdani**, Ghulam, m.a. Archæological Survey, Hyderabad, Deccan.

ORDINARY MEMBERS.

(*Chronological.*)

	1880.		
	April	7.	Rai, B. C.
	1884.		
	Nov.	5.	Middlemiss, C. S.
	1887.		
	Aug.	25.	Criper, W. R.
	1888.		
	June	6.	Pennell, A. P.
	1889.		
5	Mar.	6.	La Touche, T. H. D.
	1890.		
	Mar.	5.	Ray, Sir Prafulla C.
	1892.		
	Jan.	11.	Maclagan, Sir Edward D.
	Feb.	1.	Bodding, P. O.
	1893.		
	Aug.	31.	Tate, G. Passman
	1894.		
10	Feb.	7.	Singh, H.H. Vishwa Nath
	Sept.	27.	Vost, W.
	1895.		
	Mar.	6.	Bose, Sir Jagadis C.
	July	3.	Beatson-Bell, Sir Nicholas D.
	Sept.	19.	De, K. C.
	1896.		
15	Jan.	8.	Burn, Sir Richard
	1897.		
	Dec.	1.	Seth, M. J.
	1898.		
	Jan.	5.	Dods, W. K.
	April	6.	Tagore, Sir Pradyot C.
	May	4.	Mookerjee, Sir R. N.
	1900.		
20	Dec.	5.	Grieve, J. W. A.
	1901.		
	Mar.	6.	Khan, H. R.
	,,	,,	Vogel, J. P.
	June	5.	Mann, H. H.
	Dec.	4.	Ross, Sir Edward D.
	1902.		
25	Feb.	5.	Shyam Lal.
	July	2.	Doxey, F.
	1904.		
	June	1.	Pilgrim, G. E.
	,,	,,	Tipper, G. H.
	Aug.	3.	Fermor, L. L.
30	,,	,,	Stapleton, H. E.
	1905.		
	Mar.	1.	Banerji, M.
	July	5.	Ghosh, A. C.
	Aug.	2.	McCay, D.
	1906.		
	Jan.	3.	Chapman, J. A.
35	Mar.	7.	Nahar, P. C.
	,,	,,	Woolner, A. C.
	June	6.	Mitra, M. N.
	Sept.	19.	Whitehead, R. B.
	Oct.	31.	Finlow, R. S.
40	Dec.	5.	Mahalanobis, S. C.
	1907.		
	June	5.	Suhrawardy, A. A.
	July	3.	Brown, J. C.
	,,	,,	Christie, W. A. K.
	1908.		
	Jan.	1.	Brahmachari, U. N.
45	Feb.	5.	Mukhopadhyaya, G. N.
	April	1.	Wordsworth, W. C.
	Nov.	4.	Bhattacharji, B.
	1909.		
	Jan.	6.	Shirreff, A. G.
	Mar.	3.	Chakravarti, N.
50	,,	,,	Sarvadhikary, Sir D P.
	April	7.	Bentley, C. A.
	,,	,,	Singh, P.
	July	7.	Bazaz, R. K.
	,,	,,	Bhattacharji, S. N.
55	Aug.	4.	Thompson, Sir J. P.
	Oct.	6.	Brown, P.
	,,	,,	Brühl, P.
	,,	,,	Gangoli, O. C.
	Nov.	3.	Christophers, S. R.
	1910.		
60	May	4.	Dhavle, S. B.
	,,	,,	Kemp, S. W.
	Sept.	7.	Gravely, F. H.
	1911.		
	Feb.	1.	Insch, J.
	,,	,,	Law, N. N.
65	Mar.	1.	Mahtab, Sir Bijay Chand

	May	3.	Lomax, C. E.
	June	7.	Chatterjee, K. K.
	,,	,,	Hosain, M. H.
	July	5.	Sewell, R. B. S.
70	Nov.	1.	Ahmed, K.
	1912.		
	Jan.	10.	Kazim Shirazi, A. M.
	May	1.	Harley, A. H.
	June	5.	Misra, C.
	July	3.	Andrews, E. A.
75	,,	,,	Bomford, T. L.
	Sept.	4.	Ghosh, T.
	,,	,,	Singhi, B. S.
	1913.		
	Mar.	5.	Simonsen, J. L.
	April	2.	Calder, C. C.
80	June	4.	Majumdar, R. C.
	Nov.	5.	Fox, C. S.
	1914.		
	Mar.	4.	Bacot, J.
	April	1.	Chaudhuri, G. D.
	July	1.	Law, S. C.
85	Aug.	5.	Law, B. C.
	1915.		
	April	7.	Ohtani, Count K.
	Aug.	4.	Gurner, C. W.
	Sept.	1.	Cleghorn, M. L. W.
	,,	,,	Das-Gupta, H. C.
90	Oct.	27.	Chatterjee, Sir A. C.
	1916.		
	Feb.	2.	Majumdar, N. K.
	June	7.	Mahajan, S. P.
	July	5.	Sarkar, G.
	1917.		
	April	4.	Awati, P. R.
95	June	6.	Deb, H. K.
	,,	,,	Aiyangar, K. V. R.
	Aug.	1.	Bhandarkar, D. R.
	1918.		
	Feb.	6.	Banerji, N. N.
	,,	,,	Ghosh, E. N.
100	,,	,,	Manen, Johan van
	,,	,,	Singh, B. M.
	April	3.	Das, J. R.
	,,	,,	Prashad, B.
	,,	,,	Sinha, B. N.
105	July	3.	Basu, C. C.
	Aug.	7.	Maitra, J. N.
	1919.		
	Feb.	5.	Yazdani, G.
	Mar.	5.	Gupta, S. P.
	April	2.	Bal, S. N.
110	,,	,,	Friel, R.
	June	4.	Matthai, G.

Nov.	5.	Hemraj, R.	
,,	,,	Pascoe, Sir E. H.	
1920.			
Mar.	3.	Mahalanobis, P. C.	
,,	,,	Sundara Raj, B.	115
April	7.	Dutt, K. K.	
May	5.	Ghosh, S. N.	
June	2.	Skinner, S. A.	
,,	,,	Suhrawardy, H.	
July	7.	Knowles, R.	120
,,	,,	Roy-Chaudhuri, H. C.	
Aug.	4.	Dikshit, K. N.	
Sept.	1.	Chakladar, H. C.	
,,	,,	Chanda, R.	
,,	,,	Chatterjee, N. C.	125
Dec.	1.	Connor, Sir F. P.	
,,	,,	Akbar Khan, M.	
1921.			
Jan.	5.	Ray, J.	
Feb.	2.	Jain, Chhote Lall	
,,	,,	Mukerjee, R.	130
,,	,,	Mookerjee, S. C.	
Mar.	2.	Acton, H. W.	
,,	,,	Agharkar, S. P.	
June	1.	Muzamilullah Khan, Mohammad	
Sept.	7.	Ray, H. C.	135
Nov.	2.	Hora, S. L.	
Dec.	7.	Barua, B. M.	
1922.			
Feb.	1.	Bhattacharya, V. S	
,,	,,	Chopra, R. N.	
,,	,,	Raman, Sir C. V.	140
April	5.	Abdul Ali, A. F. M.	
,,	,,	Bose, J. C.	
June	5.	Bhattacharya, S. P.	
Sept.	6.	Das-Gupta, S. N.	
Nov.	1.	Strickland-Anderson, Mrs.	145
Dec.	6.	Blackett, Sir Basil P.	
1923.			
Mar.	7.	Labey, G. T.	
,,	,,	Stamp, L. D.	
May	2.	Möller, H. P.	
,,	,,	Shebbeare, E. O.	150
June	6.	Bhanot, K. D.	
,,	,,	Howard, A.	
,,	,,	Hutton, J. H.	
Aug.	1.	Biswas, K. P.	
,,	,,	Stow, Sir A. M.	155
Dec.	5.	Chopra, B. N.	
,,	,,	Barwell, N. F.	
,,	,,	Jackson, P. S.	
,,	,,	Korke, V. T.	
,,	,,	Sen, H. H. Lakshman	160
,,	,,	Pande, S. B.	

1924.

	Feb.	6.	Mahindra, K. C.
	Mar.	5.	Banerjee, P. N.
	,,	,,	Kanjilal M. N.
165	,,	,,	Mukerji, S.
	,,	,,	Martin, T. L.
	,,	,,	Mitter, Sir P. C.
	,,	,,	Mitter, Sir B. L.
	,,	,,	Mitter, D. N.
170	,,	,,	McPherson, J.
	,,	,,	Chatterji, M. M.
	,,	,,	Sircar, N. N.
	,,	,,	Sircar, Sir N. R.
	April	2.	Bahl, K. N.
175	,,	,,	Das, B. M.
	,,	,,	Ghose, K.
	,,	,,	Judah, N. J.
	,,	,,	Richards, F. J.
	,,	,,	Haq, M.
180	,,	,,	Mitra, J. C.
	,,	,,	Ghose, Sir C. C.
	May	7.	Rose, G. F.
	,,	,,	Bhattacharya, B.
	July	2.	Ray, A. C.
185	,,	,,	Browne, L. E.
	,,	,,	Mookerjee, S. P.
	,,	,,	Ray, B. C.
	Aug.	6.	Chatterji, S. K.
	,,	,,	Nyss, Wm. B. S.
190	,,	,,	Moloney, W. J.
	,,	,,	Roy-Chowdhury, B. K.
	,,	,,	Davies, L. M.
	Nov.	5.	Chattopadhyay, K. P.
	,,	,,	Baidil, A. M.
195	,,	,,	Sahni, B.
	,,	,,	Mookerji, B. N.
	,,	,,	Asaduzzaman.
	,,	,,	Kapur, S.
	Dec.	3.	Siddiqi, A.
200	,,	,,	Das, S. N.
	,,	,,	Mookerjee, J. N.
	,,	,,	Newman, Chas. F.
	,,	,,	Rao, H. S.
	,,	,,	Pushong, E. S.
205	,,	,,	Rogers, T. E.
	,,	,,	Basu, J. N.
	,,	,,	Ghose, S. C.
	,,	,,	Sarkar, C. K.
	,,	,,	Hendry, C. A.
210	,,	,,	Roerich, G. N.
	,,	,,	Sen, H. K.
	,,	,,	Khan, R. R.

1925.

	Jan.	7.	Dutt, K. C.
	Feb.	4.	Guha, B. S.
215	Mar.	4.	Benthall, E. C.
	,,	,,	Bhatnagar, J. L.
	,,	,,	Chaudhuri, J.
	,,	,,	Das, A. N.
	Mar.	4.	Deb, Kshitindra
220	April	1.	Perier, F.
	,,	,,	Hobbs, H
	,,	,,	Mohomed, I. A.
	,,	,,	Laden La, S. W.
	,,	,,	Sidiq, S. M.
225	,,	,,	Sen, B. C.
	May	6.	Abbasi, M. A.
	,,	,,	Baral, G. C.
	,,	,,	Bose, H. M.
	,,	,,	Jatia, Sir O. M.
230	,,	,,	Khanna, V. L.
	,,	,,	Koester, Hans
	,,	,,	Rao, M. V.
	,,	,,	Staub, Max.
	,,	,,	Ukil, A. C.
235	,,	,,	Wadia, D. N.
	June	3.	Datta, S. K.
	,,	,,	Lal, B. B.
	,,	,,	Musa, M.
	July	6.	Bose, M. M.
240	Aug.	3.	Chhibber, H. L.
	,,	,,	Coyajee, Sir J. C.
	,,	,,	Pruthi, H. S.
	Nov.	2.	Acharya, P.
	,,	,,	Chattopādhyāya, K. C.
245	,,	,,	Crookshank, H.
	,,	,,	Kimura, R.
	,,	,,	Sharif, M.
	Dec.	7.	Afzal, S. M.
	,,	,,	Narayanaswami, V.

1926.

250	Jan.	4.	Brahmachari, I. B.
	,,	,,	Fleming, Andrew
	,,	,,	Gaffar, Abdul
	,,	,,	Hubert, Otto
	,,	,,	Murray, H.
255	,,	,,	Shortt, H. E.
	,,	,,	Sinton, J. A.
	,,	,,	Stapleton, G. (Miss)
	,,	,,	Sur, S. N.
	Feb.	1.	Ruthnaswamy, M.
260	,,	,,	Rao, T. R.
	,,	,,	Setna, S. B.
	,,	,,	Kashyap, S. R.
	,,	,,	Ghuznavi, Sir A. K.
	,,	,,	Hingston, H.
265	,,	,,	Harris, H. G.
	,,	,,	Ghuznavi, A. H.
	,,	,,	Khambata, R. B.
	Mar.	1.	Bannerjee, W. C.
	,,	,,	McKay, J. W.
270	,,	,,	Mookerjee, S. C.
	,,	,,	Snaith, J. F.
	,,	,,	Gupta, D. N.
	,,	,,	Mukherjee, A. N.
	,,	,,	Datta, H. N.
275	,,	,,	Basu, N. K.

	Mar.	1.	Kramrisch, Stella.
	,,	,,	Bagnall, J. F.
	April	5.	Senior-White, R.
	,,	,,	Ghose, B. C.
280	,,	,,	Parker, R. H.
	,,	,,	Bhatia, M. L.
	,,	,,	Mitter, K. N.
	,,	,,	Jones, T.
	,,	,,	Mitter, K. K.
285	May	3.	Bhagwant Rai.
	June	7.	Lemmon, R. D.
	July	5.	Mukhopadhyaya, P. K.
	,,	,,	Tyson, J. D.
	,,	,,	Lyne, H. W.
290	Aug.	2	Sohoni, V. V.
	,,	,,	Majumdar, D. N.
	,,	,,	Mukherjee, J. N.
	,,	,,	Khettry, B.
	Nov.	1.	Jameson, T. B.
295	,,	,,	Modi, J. R. K.
	,,	,,	Westcott, F.
	,,	,,	Barhut, T. K.
	,,	,,	Pugh, L. P. E
	,,	,,	Ramanujaswami, P. V.
300	,,	,,	Mills, J. P.
	,,	,,	Galstaun, S.
	,,	,,	Chokhani, S.
	,,	,,	Bagchi, P. C.
	Dec.	6.	Brahmachari, B. B.
305	,,	,,	Aiyangar, S. K.
	,,	,,	Guha, S.
	,,	,,	Rau, A. S.
	,,	,,	Roy, A. K.
	,,	,,	Winfield, W. W.

1927.

310	Jan.	3.	Chakravarty, N.
	,,	,,	Bivar, H. G. S.
	Feb.	7.	Imam, A. M. S. H.
	,,	,,	Chatterjee. A.
	,,	,,	Ghosh, J. C.
315	,,	,,	Captain, D. M.
	,,	,,	Mukherjee, H. N.
	Mar.	7.	Hopkinson, A. J.
	,,	,,	Urquhart, W. S.
	,,	,,	Bake, A. A.
320	,,	,,	Rankin, Sir G.
	,,	,,	Stagg, M.
	,,	,,	Ward, Mrs. D.
	,,	,,	Ghosh, P. N.
	,,	,,	Abdul Kadir, A. F. M.
325	,,	,,	Fukushima, N.
	,,	,,	Wright, F. M.
	April	4.	Helland, B. A.
	,,	,,	Suhrawardy, Sir Z. R. Z.
	,,	,,	Dewick, E. C.
330	,,	,,	Bridge, P. G.
	May	2.	Hürlimann, M.
	,,	,,	Watson. A. H.
	June	6.	Nandi, Maharaja S. C.
	June	6.	Jain, B.
335	,,	,,	Sinha, S. P.
	July	4.	Chatterjee, P.
	,,	,,	Chakravarti, C.
	,,	,,	Vance, R. L.
	Nov.	7.	Tarkatirtha, B.
340	,,	,,	Mukherji, D.
	,,	,,	Fitzgerald, T. J.
	,,	,,	Brahmachary, S. C.
	Dec.	5.	Namgyal, H.H. Sir Tashi
	,,	,,	Dechhen, H.H. Kunzang
345	,,	,,	Chowdhury, C.
	,,	,,	Ghosh, K.
	,,	,,	Mukerjee, S. K.

1928.

	Jan.	2.	Basu, N. M.
	,,	,,	de Mello, F.
350	,,	,,	Puri, I. M.
	,,	,,	Wats, R. C.
	,,	,,	Chaube, R. K.
	,,	,,	Mehta, M. H.
	Feb.	6.	Sinha, S. C.
355	,,	,,	Kewal, G. S.
	,,	,,	Ezra, Sir D.
	,,	,,	Reneman, Nico
	,,	,,	Evans, F. L.
	,,	,,	Mukerji, M. N.
360	,,	,,	Rai, L. N.
	,,	,,	Williams, T. T
	,,	,,	Mallik, S. N.
	,,	,,	Shumsher, Sir Kaiser
	Mar.	5.	Waight, H. G.
365	,,	,,	Plessen, Baron L.
	,,	,,	Melhuish, R. A.
	,,	,,	Gooptu, D. N.
	,,	,,	Das, Kedarnath
	,,	,,	Hawes, G. L.
370	,,	,,	Fullerton, G. M.
	,,	,,	Neogi, P.
	,,	,,	Biswas, C. C.
	,,	,,	Eberl, Otto
	April	2.	Shaw, E. B.
375	,,	,,	Hargopal.
	,,	,,	Roy, S. K.
	,,	,,	Mullick, K. C.
	,,	,,	Bhattacharjee, N. C.
	,,	,,	Kumar, K. K.
380	,,	,,	Chowdhury, Rai J.
	,,	,,	Harris, L. E.
	,,	,,	Mookerjea, B.
	May	7.	Chatterji, K. N
	,,	,,	Chatterjea, Sir N. R.
385	,,	,,	Tucci, G.
	,,	,,	Murray, E. F. O.
	,,	,,	Moledina, M. H.
	,,	,,	Chowdhury, A. N.
	,,	,,	Gupta, J. N.

390	May	7.	Basu, N.
	,,	,,	Ghosal, U. N.
	,,	,,	Mallik, S. C.
	,,	,,	Basak, S. C.
	,,	,,	Lord Sinha of Raipur
395	,,	,,	Saha, M. N.
	June	4.	Bhadra, S. N.
	,,	,,	Hobart, R. C.
	,,	,,	Narasimham, Y.
	,,	,,	Bhattasali, N. K.
400	July	2.	Tagore, R. M.
	,,	,,	Roerich, N.
	,,	,,	Das, P. K.
	,,	,,	Hosain, Nawab Musharruf.
	Aug.	6.	Jaitly, P. L.
405	,,	,,	Urchs, O.
	,,	,,	Mitra, S.
	,,	,,	Ghuznavi, I. S. K.
	,,	,,	Drummond, J. G.
	,,	,,	Heron, A. M.
410	Nov.	5.	Olpadvala, E. S.
	,,	,,	Bose Mullick, G. N.
	,,	,,	Ishaque, M.
	,,	,,	Choprha, G.
	,,	,,	Statham, R. M.
415	,,	,,	Reinhart, W.
	,,	,,	Rahman, A. S. M. L.
	,,	,,	Galstaun, J. C.

1929.

	Jan.	7.	Basu, S. C.
	,,	,,	Pillai, G. P
420	,,	,,	Campbell Forrester, Mrs. Florence.
	,,	,,	Ghose, M. C.
	Feb.	4.	Narain, Hirde
	,,	,,	de Gasparin, Edith
	,,	,,	Srimani, J.
425	,,	,,	Jenkins, W. A
	,,	,,	Dev, Raja R.
	Mar.	4	Titus, M. T.
	,,	,,	Iyer, M. S.
	,,	,,	Travers, W. L.
430	,,	,,	Goil, D. P.
	,,	,,	Deb, P. N.
	,,	,,	Mitter, H. K.
	,,	,,	De, J. C
	,,	,,	Basu, B. K.
435	,,	,,	Lunan, A. G.
	,,	,,	Mullick, P. N.
	,,	,,	Mitra, J. M.
	,,	,,	Boral, A P.
	April	1.	Ghose, D. P.
440	,,	,,	Asadullah, K. M.
	,,	,,	Rizvi, S. H. H.
	,,	,,	Ginwala, Sir P.
	,,	,,	Sen-Gupta, N. C.
	May	6.	Sharma, S. R.
445	,,	,,	Williams, H. F. F.
	May	6.	Sastri, D. S. B.
	,,	,,	Pawsey, C. R.
	,,	,,	Sanyal, S. C.
	,,	,,	Aken, C. E. van
450	,,	,,	Kapur, Dewan R. C.
	June	3.	Sen, P. C.
	July	1.	Dunn, J. A.
	,,	,,	Banerji, B. B.
	Aug.	5.	Sommerfeld, A.
455	Nov.	4.	Berthoud, G. F.
	,,	,,	Singh, J.
	,,	,,	Mitra, M. N.
	,,	,,	Cotter, G. de P.
	,,	,,	Campbell, G. R.
460	,,	,,	Parry, N. E.
	,,	,,	Jarvis, R. Y.
	,,	,,	Edwards, L. B.
	,,	,,	Siddiqi, M. Z.
	Nov.	4.	Kurup, P. C. K.
465	,,	,,	Mallya, B. G.
	Dec.	2.	Fisher, Bishop F. B.
	,,	,,	Khan, M. R.
	,,	,,	Fawcus, L. R.
	,,	,,	Thomas, H. W.
470	,,	,,	Maynard, B. M.

1930.

	Jan.	6.	Jain, N. K.
	,,	,,	Haldar, S. K.
	,,	,,	Bassewitz, Count
	,,	,,	Douglas, R.
475	,,	,,	Hamilton, Sir D. M.
	,,	,,	McNair, G. B.
	,,	,,	Martin, M. F. C.
	,,	,,	Chakraverti, S. C.
	Feb.	3.	Henderson, A. G.
480	,,	,,	Mahtab, U. C.
	,,	,,	Korni, M. A.
	,,	,,	Pettigrew, W.
	,,	,,	Chakravarti, M. N.
	Mar.	3.	Mukharji, I. C.
485	,,	,,	Ashton, H. S.
	April	7.	Pessein, J. F.
	,,	,,	Ahmad, S. K.
	,,	,,	Swami, V. N.
	May	5.	Deo, P. C. Bhanj
490	,,	,,	Matthias, O. G.
	,,	,,	Mallam, G. L.
	,,	,,	Cooper, G. A. P.
	June	2.	Kenny, D. E. C.
	,,	,,	Oyevaar, J. J.
495	July	7.	Mahudavala, J. J.
	Aug.	4.	Popper, S. W.
	,,	,,	Raparia, T. C.
	Nov.	3.	Sahaya, S.
	,,	,,	Austin, G. J.
500	,,	,,	Rahman, S. K.
	,,	,,	Newman, C. D.
	Dec.	1.	Roy, Kumar K.

1931.
Jan. 5. Fooks, H. A.
,, ,, Bhattacharji, U. C.
505 ,, ,, Shukla, J. P.
,, ,, Chatterji, D.
,, ,, Evans, P.
Feb. 2. Wauchope, R. S.
,, ,, Douglas, G. W.
510 ,, ,, Fraser, W. A. K.
Feb. 2. Clough, J.
Mar. 2. Bose, S. K.
,, ,, Kothari, N. L.
April 6. Bhose, J. C.
,, ,, Prasad, S. 515
May 4. Bottomley, J. M.
June 1. Lort-Williams, J.
Aug. 3. Barua, K. L.
Dec. 7. Eliade, M.

LIFE MEMBERS.

(*Chronological.*)

	5-11-84	C. S. Middlemiss (30 N.).
	6- 6-88	A. P. Pennell (88 F.).
	6- 3-89	T. H. D. La Touche (10 N.).
	11- 1-93	Sir Edward D. Maclagan (94 R.).
5	1- 2-93	P. O. Bodding (14 N.).
	31- 7-93	G. P. Tate (23 N.).
	27- 9-94	W. Vost (94 F.).
	3- 7-95	Sir Nicholas D. Beatson-Bell (95 N.).
	19- 9-95	K. C. De (26 R.).
10	3- 5-98	Sir R. N. Mookerjee (29 R.).
	5-12-00	J. W. A. Grieve (00 F.).
	6- 2-01	J. Ph. Vogel (25 F.).
	2- 7-02	F. Doxey (28 R.).
	1- 6-04	G H. Tipper (27 N.).
15	28- 9-04	H. E. Stapleton (26 R.).
	2- 8-05	D. McCay (29 F.).
	3- 1-06	J. A. Chapman (28 N.).
	7- 3-06	A. C. Woolner (28 N.).
	19- 7-06	R. B. Whitehead (26 N.).
20	3- 7-07	J. Coggin Brown (28 N.).
	3- 7-07	W. A. K. Christie (29 N.).
	1- 1-08	U. N. Brahmachari (27 R.).
	7- 4-09	C. A. Bentley (30 N.).
	6-10-09	P. J. Brühl (28 N.).
25	4- 5-10	S. B. Dhavle (10 N.).
	4- 5-10	S. W. Kemp (29 F.).
	1- 2-11	Jas. Insch (28 R.)
	7- 6-11	M. Hidayat Hosain (27 N.).
	5- 7-11	R. B. S. Sewell (28 N.)
30	1-11-11	Kamaluddin Ahmad (24 N.).
	5- 3-13	J. L. Simonsen (19 N.).
	4- 3-14	J. Bacot (14 F.).
	5- 7-16	G. Sircar (29 N.).
	6- 2-18	E. N. Ghosh (25 R.).
35	6- 2-18	Johan van Manen (25 R.).
	3- 4-18	B. Prashad (29 R.)
	2-11-21	S. L. Hora (30 N.).
	6- 6-23	A. Howard (30 N.).
	5-12-23	H.H. Lakshman Sen (24 N.).
40	7- 5-24	B. Bhattacharya (24 N.).
	6- 8-24	L. M. Davies (24 N.).
	3-12-24	G. Roerich (28 F.).
	6- 6-27	B. D. Jain (28 R.).
	5-12-27	Chhajuram Chowdhury (27 R.).
45	5-12-27	H.H. Sir Tashi Namgyal (27 N.).
	5-12-27	H.H. Kunzang Dechhen (27 N.).
	6- 2-28	Sir D. Ezra (28 R.).
	6- 2-28	Sir Kaiser Shumsher Jung Bahadur Rana (28 N.).
	2- 7-28	N. Roerich (28 F.).
50	5-11-28	W. Reinhart (28 F.).
	3- 3-30	H. S. Ashton (30 N.).
	5- 1-31	P. Evans (31 N.).

SPECIAL HONORARY CENTENARY MEMBER.

Date of Election.	
15-1-84	A. H. Sayce, *Professor of Assyriology, Queen's College.* Oxford, England.

ASSOCIATE MEMBERS.

Date of Election.	
7-12-10	*H. Hosten, Rev., s.j. St. Joseph's College, Darjeeling.
1-2-22	†Pierre Johanns, Rev., s.j., b.litt. (Oxon.), *Professor of Philosophy.* St. Xavier's College, 30, Park Street, Calcutta.
1-2-22	†Anantakrishna Sastri, Mahamahopadhyaya. 57/1, Sreegopal Mullick Lane, Calcutta.
6-2-24	*W. Ivanow. c/o Asiatic Society of Bengal, 1, Park Street, Calcutta.
6-2-24	*Kamalakrishna Smrititirtha, Mahamahopadhyaya. Bhatpara, 24-Parganas.
1-2-26	Durgadas Mukherjee, m.a., *Professor.* 35, Ballygunge Circular Road, Calcutta.
2-5-27	N. N. Vasu, Rai Saheb. 20, Visvakosh Lane, Baghbazar, Calcutta.
2-12-29	Sarat Chandra Roy, Rai Bahadur, m.a., b.l. Church Road, Ranchi.

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† Re-elected for a further period of five years on 7-3-1927 under Rule 2c.

* Re-elected for a further period of five years on 4-2-1929 under Rule 2c.

INSTITUTIONAL MEMBERS.

Date of Election.	
28-10-29	The Legatum Warnerianum (Oriental Department), University of Leyden, Leyden, Holland.
2-12-29	The Adyar Library, Adyar, Madras S.

ORDINARY FELLOWS.

Date of Election.	
2-2-10	T. H. D. La Touche, b.a., f.g.s.
2-2-10	Sir Prafulla Chandra Ray, kt., c.i.e., m.a., d.sc.
2-2-10	Sir E. D. Ross, kt., c.i.e., ph.d.
7-2-12	Sir J. C. Bose, kt., c.s.i., c.i.e., m.a., d.sc., f.r.s.

	Date of Election.	
5	7-2-12	P. J. Brühl, I.S.O., F.G.S., PH.D., F.C.S.
	7-2-12	S. R. Christophers, C.I.E., O.B.E., I.M.S.
	7-2-12	C. S. Middlemiss, C.I.E., B.A., F.G.S., F.R.S.
	5-2-13	J. Ph. Vogel, PH.D., LITT.D.
	5-2-13	S. W. Kemp, B.A., D.SC.
10	3-2-15	G. H. Tipper, M.A., F.G.S., M.INST.M.M.
	2-2-16	Sir Richard Burn, KT., C.I.E., I.C.S.
	2-2-16	L. L. Fermor, O.B.E., A.R.S.M., D.SC., F.G.S.
	7-2-17	F. H. Gravely, D.SC.
	6-2-18	J. L. Simonsen, D.SC., F.I.C.
15	6-2-18	D. McCay, M.D., M.R.C.P., I.M.S.
	6-2-18	A. A. Suhrawardy, M.A., PH.D., D.LITT., LL.D.
	5-2-19	J. Coggin Brown, O.B.E., M.I.M.E., F.G.S.
	5-2-19	W. A. K. Christie, B.SC., PH.D., M.INST.M.M.
	5-2-19	D. R. Bhandarkar, M.A., PH.D.
20	5-2-19	R. B. Seymour Sewell, M.A., M.R.C.S., L.R.C.P., F.Z.S., I.M.S.
	2-2-21	U. N. Brahmachari, M.A., PH.D., M.D.
	1-2-22	Sir Edwin H. Pascoe, KT., M.A., D.SC., SC.D., F.G.S.
	1-2-22	Ramaprasad Chanda, B.A.
	7-2-23	G. N. Mukhopadhyaya, B.A., M.D.
25	4-2-25	M. Hidayat Hosain, PH.D.
	4-2-25	Guy E. Pilgrim, D.SC., F.G.S.
	4-2-25	Sir C. V. Raman, KT., M.A., D.SC., F.R.S.
	1-2-26	P. O. Bodding, M.A.
	7-2-27	R. Knowles, B.A., M.R.C.S., L.R.C.P., I.M.S.
30	7-2-27	Johan van Manen, C.I.E.
	7-2-27	B. Sahni, D.SC.
	7-2-27	A. C. Woolner, C.I.E., M.A.
	6-2-28	H. E. Stapleton, M.A., B.SC., I.E.S.
	6-2-28	B. Prashad, D.SC., F.Z.S., F.R.S.E
35	6-2-28	C. A. Bentley, M.B., D.P.H., D.T.M. & H.
	4-2-29	A. Howard, C.I.E., M.A.
	4-2-29	J. H. Hutton, C.I.E., I.C.S., M.A., D.SC.
	4-2-29	Sir Edward D. Maclagan, K.C.S.I., K.C.I.E.
	3-2-30	H. W. Acton, C.I.E., M.R.C.S., L.R.C.P., I.M.S.
40	3-2-30	G. de P. Cotter, B.A., SC.D., M.INST.M.M., F.G.S.
	3-2-30	S. L. Hora, D.SC., F.Z.S., F.R.S.E.
	3-2-30	J. P. Mills, I.C.S., M.A., J.P
	3-2-30	Meghnad Saha, D.SC., F.R.S.
	2-2-31	S. Krishnaswami Aiyangar, M.A., PH.D., F.R.HIST.S.
45	2-2-31	R. N. Chopra, M.B., I.M.S.
	2-2-31	R. B. Whitehead, I.C.S. (*retired*).

HONORARY FELLOWS

Date of Election.	
5-2-96	Charles Rockwell Lanman. 9, Farrar Street, Cambridge, Massachusetts, U.S.A.
2-3-04	Sir George Abraham Grierson, K.C.I.E., O.M., PH.D., D.LITT., LL.D., F.B.A., I.C.S. (*retired*). Rathfarnham, Camberley, Surrey, England.
6-9-11	Alfred William Alcock, C.I.E., M.B., LL.D., F.R.S. Heathlands, Belvedere, Kent, England.

Date of Election.		
6-9-11	Kamakhyanath Tarkavagisa, Mahamahopadhyaya. 111/4, Shambazar Street, Calcutta.	
5-8-15	Sir Joseph John Thomson, kt., o.m., m.a., sc.d., d.sc., ll.d., ph.d., f.r.s. Trinity College, Cambridge, England.	5
6-12-16	G. A. Boulenger, f.r.s., ll.d. Jardin Botanique du L'Etat, Brussels.	
2-5-17	Herbert Allen Giles, m.a., ll.d., d.litt., *Professor.* 10, Selwyn Gardens, Cambridge, England.	
4-2-20	Sylvain Levi. Collège de France, rue Guy-de-la-Brosse 9, Paris, V^{e}.	
4-2-20	Sir Aurel Stein, k.c.i.e., ph.d., d.litt., d.sc., d.o.l., f.b.a. Srinagar, Kashmir.	
4-2-20	A. Foucher, d.litt. Boulevard Raspail 286, Paris, XVI^{e}.	10
4-2-20	Sir Arthur Keith, m.d., f.r.c.s., ll.d., f.r.s. Royal College of Surgeons of England, Lincoln's Inn Fields, London, W.C. 2.	
4-2-20	R. D. Oldham, f.r.s., f.g.s., f.r.g.s. 1, Broomfield Road, Kew, Surrey, England.	
4-2-20	Sir David Prain, kt., c.m.g., c.i.e., m.a., m.b., ll.d., f.r.s.e., f.l.s., f.r.s., f.z.s., m.r.i.a. Royal Botanic Gardens, Kew, Surrey, England.	
4-2-20	Sir Joseph Larmor, kt., m.p., m.a., d.sc., ll.d., d.c.l., f.r.s., f.r.a.s. St. John's College, Cambridge, England.	
4-2-20	Sir James Frazer, kt., d.c.l., ll.d., litt.d. Trinity College, Cambridge.	15
4-2-20	J. Takakusu. Imperial University of Tokio, Japan.	
2-3-21	F. W. Thomas, c.i.e., m.a., ph.d., *Boden Professor of Sanskrit, University of Oxford.* 161, Woodstock Road, Oxford, England.	
7-6-22	Sir Thomas Holland, k.c.s.i., k.c.i.e., d.sc., f.r.s. Imperial College of Science and Technology, South Kensington, London, S.W. 7.	
7-6-22	Sir Leonard Rogers, kt., c.i.e., m.d., b.s., f.r.c.p., f.r.s., i.m.s. 24, Cavendish Square, London, 4.	
7-1-25	Sten Konow. Ethnographisk Museum, Oslo, Norway.	20
7-3-27	The Rt. Hon'ble The Earl of Lytton, p.c., g.c.s.i., g.c.i.e. Knebworth, Herts, England.	
4-7-27	C. Snouck Hurgronje. Rapenburg 61, Leiden, Holland.	
5-12-27	Lt.-Col. Sir T. Wolseley Haig, k.c.i.e., c.s.i., c.b.e., m.a., c.m.g. 34, Gledstanes Road, West Kensington, London, W. 14.	
2-12-29	Sir Rajendra Nath Mookerjee, k.c.i.e., k.c.v.o. 7, Harington Street, Calcutta.	
2-12-29	Dr. Charles J. H. Nicolle, *Director.* Pasteur Institute, Tunis.	25
5-5-30	R. Robinson, f.r.s. Department of Chemistry, University of London, University College, Gower Street, London, W.C. 1.	
5-5-30	Dr. W. Caland. Koningslaan 78, Utrecht, Holland.	
5-5-30	Dr. H. Jacobi. 59, Niebuhrstrasse, Bonn, Germany.	
2-3-31	Shams-ul-Ulama Sir J. J. Modi, kt., 211, Pilot Bunder Road, Colaba, Bombay.	

CHANGES IN MEMBERSHIP.

List of Members who have been absent from India three years and upwards.*

**Rule* 40.—After the lapse of three years from the date of a member leaving India, if no intimation of his wishes shall, in the interval, have been received by the Society, his name shall be removed from the List of Members.

The following members are liable to removal from the next Member List of the Society under the operation of the above Rule :—

1. I. A. Mohammed. (1925.)
2. L. P. E. Pugh. (1926.)
3. Sir Basil Blackett. (1922.)
4. Baron L. Plessen. (1928.)
5. E. B. Shaw. (1928.)
6. F. L. Evans. (1928.)
7. H. P. Möller. (1923.)
8. G. M. Fullerton. (1928.)

Loss of Members during 1931.

By Retirement.

Ordinary Members.

1. H. H. Haines. (1907.)
2. A. W. Botham. (1910.)
3. Kumar Sarat Kumar Ray. (1910.)
4. Rudra Datta Sinha. (1913.)
5. Hafiz Ahmad Ali Khan. (1915.)
6. Nani Gopal Majumdar. (1920.)
7. Kumar P. K. Deb. (1921.)
8. N. Ottens. (1923.)
9. W. L. Harnett. (1923.)
10. F. J. Meggitt. (1923.)
11. A. D. MacGregor. (1924.)
12. H. Browne. (1924.)
13. Bepin Behari Ghose. (1924.)
14. Narendra Nath Mukherjee. (1924.)
15. H. Cooper. (1924.)
16. K. Ramunni Menon. (1925.)
17. E. J. Bradshaw. (1925.)
18. Profulla Chandra Mitter. (1925.)
19. David Ezra Reuben. (1925.)
20. Muhammad Sanaullah. (1925.)
21. H. P. Poddar. (1925.)
22. E. C. Ormond. (1925.)
23. I. J. S. Taraporewala. (1925.)
24. E. R. Gee. (1925.)
25. A. D. Derviche-Jones. (1925.)
26. K. S. Kolah. (1925.)
27. S. N. Banerjee. (1926.)
28. Lord Meston. (1926.)

29. Brajendranath De. (1926.)
30. M. R. Oak. (1926).
31. Haraprasad Chaudhuri. (1926.)
32. D. P. Khaitan. (1926.)
33. C. A. Henry Edwards. (1926.)
34. Nawab Moin Yar Jung Bahadur. (1926.)
35. A. L. Collet. (1926.)
36. Mohammad Afzal Husain. (1926.)
37. D. R. Bhattacharya. (1927.)
38. D. M. Bose. (1927.)
39. Sir B. Narasimha Sarma. (1927.)
40. E. H. Staples. (1927.)
41. Satis Chandra De (1927.)
42. E. S. Feegrade. (1927.)
43. E. L. G. Clegg. (1927.)
44. A. A. J. Elberg. (1928.)
45. D. N. Mitra. (1928.)
46. A. W. Young. (1928.)
47. R. G. Watling. (1928.)
48. F. G. Dikkers. (1927.)
49. Benoy Kumar Sen. (1928.)
50. R. H. van de Vijver. (1928.)
51. Geoffrey Keable. (1928.)
52. B. Shaha. (1928.)
53. A. Jardine. (1928.)
54. Susil Chandra Chatterjee. (1928.)
55. Hirananda Sastri. (1928.)
56. P. N. Agate. (1929.)
57. D. J. Cohen. (1929.)
58. S. L. Mitra. (1929.)
59. Joseph Jacob. (1929.)
60. Hadji Dabiruddin Ahmed. (1929.)
61. Prafulla Nath Tagore. (1929.)
62. E. V. MacLean. (1929.)
63. Hon'ble Sushil Kumar Sinha. (1930.)
64. T. N. Seth. (1930.)
65. H. G. von Oven. (1930.)
66. A. H. Mackenzie. (1930.)
67. Jatindra Mohan Ray. (1930.)
68. J. P F. Quirke. (1930.)
69. Cyril S. Fox. (1913.) (Withdrawn.)

BY DEATH.

Ordinary Members.

1. Col. Sir Richard Carnac Temple. (1878.)
2. MM. Dr. Haraprasad Shastri. (1885.)
3. B. L. Chaudhuri. (1893.)
4. H.H. Maharaja Sir Prabhu Narain Singh. (1899.)
5. Jateendra Nath Mukherji. (1899.)
6. Jogindranath Sen. (1902.)
7. Narendra Nath Raye. (1920.)
8. Suresh Chandra Sarkar. (1922.)
9. M. N. Bannerjee. (1925.)
10. James Peddie. (1927.)

Honorary Fellow.

1. Sir Charles Eliot. (1920.)

UNDER RULE 38.

1. Sohan Lal Varma. (1925.)
2. Shyam Chand Bhor. (1925.)
3. Kshitish Chandra Chatterji. (1926.)
4. B. Viswanath. (1926.)
5. Ghulam Mohammed. (1927.)
6. Jogendra Nath Maitra. (1927.)
7. Nalini Kanta Dastidar. (1928.)
8. Promode Chandra Dutt (1928.)
9. Jogendra Nath Mitra. (1928.)
10. Kumud Bandhob Mookerjee. (1928.)

UNDER RULE 40

1. W. S. Talbot. (1904.)
2. Col. F. A. F. Barnardo. (1921.)
3. Baron H. Rudt von Collenberg. (1923.)
4. Muni Jinavijayaji. (1923.)
5. Leonardus Stark. (1925.)
6. Miss Gertrude Mariam Wright. (1928.)

MEDALLISTS.

ELLIOTT GOLD MEDAL AND CASH.

RECIPIENTS.

1893	Chandra Kanta Basu.
1895	Yati Bhusana Bhaduri.
1896	Jnan Saran Chakravarti.
1897	Sarasi Lal Sarkar.
1901	Sarasi Lal Sarkar.
1904	Sarasi Lal Sarkar.
	Surendra Nath Maitra.
1907	Akshoy Kumar Mazumdar.
1911	Jitendra Nath Rakshit.
	Jatindra Mohan Datta.
1913	Rasik Lal Datta.
	Saradakanta Ganguly.
	Nagendra Chandra Nag.
	Nilratan Dhar.
1918	Bibhutibhushan Dutta.
1919	Jnanendra Chandra Ghosh.
1922	Abani Bhusan Datta.
1923	Bhailal M. Amin.
1926	Bidhu Bhusan Ray.
1927	Kalipada Biswas.
1931	T. C. N. Singh.

BARCLAY MEMORIAL MEDAL.

RECIPIENTS.

1901	E. Ernest Green.
1903	Sir Ronald Ross, KT., K.C.B., C.I.E., K.C.M.G., M.R.C.S., F.R.C.S., D.P.H., LL.D., D.SC., M.D., F.R.S.
1905	D. D. Cunningham, C.I.E., F.R.S.
1907	A. W. Alcock, C.I.E., M.B., LL.D., F.R.S.
1909	Sir David Prain, KT., C.I.E., C.M.G., M.A., M.B., LL.D., F.R.S.E., F.L.S., F.Z.S., M.R.I.A., F.R.S.
1911	Carl Diener.
1913	William Glen Liston, C.I.E., M.D., D.P.H.
1915	J. S. Gamble, C.I.E., M.A., F.R.S.
1917	H. H. Godwin-Austen, F.R.S., F.Z.S., F.R.G.S.
1919	N. Annandale, C.I.E., D.SC., C.M.Z.S., F.L.S., F.R.S., F.A.S.B.
1921	Sir Leonard Rogers, KT., C.I.E., M.D., B.S., F.R.C.P., F.R.C.S., F.R.S.
1923	S. R. Christophers, C.I.E., O.B.E., F.R.S., F.A.S.B , M.B., LT.-COL., I.M.S.
1925	J. Stephenson, C.I.E., B.SC., M.B., CH.B., F.R.C.S., F.R.S.E., I.M.S.
1927	S. W. Kemp, B.A., D.SC., F.A.S.B.
1929	Albert Howard, C.I.E., M.A., F.A.S.B.
1931	Robert Beresford Seymour Sewell, M.A., SC.D. (CANTAB.), F.A.S.B., LT.-COL., M.R.C.S., L.R.C.P., F.Z.S., F.L.S., C.I.E., F.A.S.B., LT.-COL., I.M.S.

SIR WILLIAM JONES MEMORIAL MEDAL.

RECIPIENTS.

1927 Sir Malcolm Watson, KT., LL.D. (HON.), M.D., C.M., D.P.H.
1928 Sir George A. Grierson, K.C.I.E., O.M., PH.D., D.LITT., LL.D., F.B.A., HON. F.A.S.B., I.C.S. (*retired*).
1930 Dr. Felix H. D'Herelle.

ANNANDALE MEMORIAL MEDAL.

RECIPIENTS.

1927 Fritz Sarasin.
1930 Dr. Charles Gabriel Seligman, M.D., F.R.C.P., F.R.S.

JOY GOBIND LAW MEMORIAL MEDAL.

RECIPIENT.

1929 Max Weber.

PAUL JOHANNES BRÜHL MEMORIAL MEDAL.

RECIPIENT.

1931 Rev. Ethelbert Blatter, S.J.

PROCEEDINGS OF THE ORDINARY MONTHLY MEETINGS, 1931.

JANUARY, 1931.

An Ordinary Monthly Meeting of the Asiatic Society of Bengal was held on Monday, the 5th, at 5-30 P.M.

PRESENT.

H. E. STAPLETON, ESQ., M.A., B.Sc. (Oxon), I.E.S., F.A.S.B., Vice-President, in the Chair.

Members :

Chakravarti, Mr. Chintaharan
Chatterjee, Mr. P. P.
Chatterjee, Mr. M. M.
Ghoshal, Dr. U. N.
Hosain, Dr. M. Hidayat
Insch, Mr. James
Law, Dr. Satya Churn
Manen, Mr. Johan van
Mukherjee, Dr. S. K.
Rai-Chowdhury, Dr. H. C.
Shastri, MM. H. P.
Thomas, Mr. H. W.
Wadia, Mr. D. N.
Young, Rev. A. Willifer.

Visitors :

Chatterjee, Mr. P.
Ghose, Mr. F. N.

The minutes of the last meeting were read and confirmed.

The General Secretary reported receipt of fifteen presentations of books, etc., which had been placed on the table for inspection.

The following candidates were balloted for for election as Ordinary Members :—

(1) *Fooks, Herbert A.*, Merchant, 2, Short Street, Calcutta.
Proposer : W. K. Dods.
Seconder : L. L. Fermor.

(2) *Roychowdhury, Narain Chandra*, Rai Bahadur, Zemindar, Mahadevpur, Rajshahi.
Proposer : Upendra Nath Brahmachari.
Seconder : K. C. De.

(3) *Bhattacharjee, Umesh Chandra*, M.A., Professor of Philosophy, Bethune College, 181, Cornwallis Street, Calcutta.
Proposer : H. E. Stapleton.
Seconder : M. Mahfuz-ul Haq.

(4) *Shukla, Jagannath Prasad*, Trans Gomti Outram Road, near Badshahnagar Railway Station, Lucknow.
Proposer : Suniti Kumar Chatterji.
Seconder : Haraprasad Shastri.

(5) *Chatterji, Durgacharan,* M.A., P.R.S., Lecturer in Sanskrit, Krishnagar College, Krishnagar, Nadia.
Proposer: Johan van Manen.
Seconder: Haraprasad Shastri.

(6) *Evans, Percy,* B.A. (Cantab.), F.G.S., Geologist, c/o The Assam Oil Co., Digboi, Assam.
Proposer: S. K. Roy.
Seconder: Hem Chandra Das-Gupta.

The General Secretary reported the death of :—

(14) A. Alker (An Ordinary Member, 1923).

The General Secretary reported the loss of membership, since the previous meeting, by resignation of :—

(36) N. D. Calder (An Ordinary Member, 1926).
(37) Md. Abdur Rahman Khan (An Ordinary Member, 1928).
(38) Sudhir Kumar Bose (An Ordinary Member, 1928).
(39) M. S. Krishnan (An Ordinary Member, 1928).
(40) M. N. Mukherjee (An Ordinary Member, 1928).
(41) W. A. Buyers (An Ordinary Member, 1925).

The General Secretary reported that Lt.-Col. H. Suhrawardy, who had been declared lapsed as a member, under Rule 38, had since complied with the conditions of reinstatement as prescribed in Rule 39.

The Chairman moved a resolution for the reinstatement of Dr. Suhrawardy, which was carried unanimously.

The following papers were read :—

1. EKENDRANATH GHOSH.—*Studies on Rigvedic Deities. VII. Deities connected with Lunar Asterisms.*
2. M. M. CHATTERJI.—*Saktaism or Woman Symbol of Divinity.*
3. SATYA CHURN LAW.—*Pahariya Names of some Birds of Darjeeling.*
4. SASHIBHUSAN CHAUDHURI.—*Historical Movement of Peoples in ancient India.*
5. GEORGE ROERICH.—*Les Çlokas Grammaticaux de Thonmi Sambhota avec leurs commentaires by Jacques Bacot.—A new work on Tibetan Grammar by Jacques Bacot.*

The following communication was made :—

1. JOHAN VAN MANEN.—*Recent work on the study of Proverbs.*

The Chairman announced the result of the ballot for the election of Ordinary Members and declared all candidates duly elected.

The Chairman announced that the Annual Meeting of the Society would take place on Monday, the 2nd February, 1931, and invited the members present to communicate with the General Secretary the names and addresses of non-members to whom they wished invitations to be issued.

◆

FEBRUARY, 1931.

An Ordinary Monthly Meeting of the Asiatic Society of Bengal was held on Monday, the 2nd, immediately after the termination of the Annual Meeting.

PRESENT.

RAI UPENDRA NATH BRAHMACHARI, BAHADUR, M.A., M.D., Ph.D., F.A.S.B., Vice-President, in the Chair.

Members :

Agharkar, Dr. S. P.
Bake, Mr. A. A.
Bose, Mr. M. M.
Chatterjee, Mr. P. P.
Das, Mr. P. K.
De, Mr. K. C.
Fleming, Mr. Andrew
Ghose, Mr. B. B.
Ghose, Dr. P. N.
Ghoshal, Dr. U. N.
Insch, Mr. James
Knowles, Lt.-Col. R.
Manen, Mr. Johan van
Stapleton, Mr. H. E.
Young, Rev. A. W.

The minutes of the last meeting were read and confirmed.

The General Secretary announced that the presentation of books, etc., received during the last month would be exhibited in the next meeting.

The following candidates were balloted for for election as Ordinary Members :—

(7) *Wauchope, R. S.,* O.B.E., A.I.C.E., F.R.A.I., I.A., Major, Assistant Surveyor-General, Survey of India, 13, Wood Street, Calcutta.
Proposer : R. Knowles.
Seconder : L. L. Fermor.

(8) *Douglas, Gordon Watson,* B.Sc., D.L.M., State Chemist to the Government of Bhopal, State Laboratory, Bhopal, Central India.
Proposer : C. F. Newman.
Seconder : Johan van Manen.

(9) *Fraser, William Archibald Kenneth,* Lt.-Col., C.B.E., D.S.O., M.V.O., M.C., Military Officer, Government House, Calcutta.
Proposer : R. B. Seymour Sewell.
Seconder : Johan van Manen.

(10) *Clough, John,* Barrister-at-Law, Bar Library, High Court, Calcutta.
Proposer : N. Barwell.
Seconder : L. L. Fermor.

The General Secretary reported the deaths of :—

(15) A. A. Macdonell (An Honorary Fellow, 1922).
(1) M. N. Banerjee (An Ordinary Member, 1925).

The General Secretary reported the loss of membership, since the previous meeting, by resignation of :—

(42) F. L. De (An Ordinary Member, 1924).
(43) A. S. Tritton (An Ordinary Member, 1927).
(44) P. C. Sinha (An Ordinary Member, 1925).

(45) J. C. French (An Ordinary Member, 1927).
(1) F. J. Meggitt (An Ordinary Member, 1923).
(2) Mrs. A. A. J. Elberg (An Ordinary Member, 1928).
(3) D. N. Mitra (An Ordinary Member, 1928).
(4) Sarat Kumar Roy (An Ordinary Member, 1910).

In accordance with Rules 37 and 38, the General Secretary announced that the names of the following Ordinary Members would be suspended as defaulters within the Society's building for the period of a month to be removed from the Society's registers for non-payment, unless the amount due be paid before the next Ordinary Monthly Meeting :—

Shyam Chand Bhor
K. C. Chatterjee
N. K. Dastidar
P. C. Dutt
Jogendra Nath Maitra
Jogendra Nath Mitra
Ghulam Mohammed
K. B. Mookerjee
S. L. Varma
B. Visvanath.

In accordance with Rules 2 and 13, the General Secretary announced that the Council had proposed for election the name of Sir Jivanji Jamshedji as an Honorary Fellow of the Society. The General Secretary stated the grounds on which the recommendation had been made.

The Chairman announced the result of the ballot for the election of Ordinary Members and declared all candidates duly elected.

MARCH, 1931.

An Ordinary Monthly Meeting of the Asiatic Society of Bengal was held on Monday, the 2nd, at 5-30 P.M.

Present.

Rai Upendra Nath Brahmachari, Bahadur, M.A., M.D., Ph.D., F.A.S.B., Vice-President, in the Chair.

Members :

Chakravarti, Mr. Chintaharan
De, Mr. K. C.
Ghose, Mr. T. P.
Ghuznavi, Mr. I. S. K.
Haq, Mr. M. Mahfuz-ul
Hobbs, Mr. H.
Hosten, Fr. H., S.J.
Manen, Mr. Johan van
Rahman, Mr. S. K.
Ray, Mr. J. M.
Sarbadhikary, Sir D. P.
Seth, Mr. M. J.
Wadia, Mr. D. N.
Watling, Mr. R. G.

Visitors :

Ghose, Mr. Ajit
Watling, Mrs.

The minutes of the last meeting were read and confirmed.

The General Secretary reported receipt of nineteen presentations of books, etc., which had been placed on the table for inspection.

The following candidates were balloted for for election as Ordinary Members :—

(11) *Bose, Sudhansu Kumar*, B.Sc. (Cal.), A.R.S.M., B.Sc. (Mining), London, Professor of Mining and Surveying, Indian School of Mines, Dhanbad.
Proposer : S. K. Roy.
Seconder : D. N. Wadia.

(12) *Kothari, N. L.*, Colliery Manager, c/o Messrs. K. Worah & Co., Jharia, Manbhum.
Proposer : S. K. Roy.
Seconder : D. N. Wadia.

The General Secretary reported the loss of membership, since the previous meeting, by resignation of :—

(5) D. R. Bhattacharyya (An Ordinary Member, 1927).
(6) S. L. Mitra (An Ordinary Member, 1928).
(7) P. K. Deb (An Ordinary Member, 1921).
(8) A. W. Botham (An Ordinary Member, 1910).

The General Secretary reported the constitution of the various standing Committees of the Society for the ensuing year to be as follows :—

Finance Committee :

President.
Treasurer. } *Ex-officio.*
General Secretary.
MM. H. P. Shastri.
Mr. J. C. Mitra.
Mr. James Insch.

Library Committee :

President.
Treasurer.
General Secretary.
Philological
Jt. Philological } *Ex-officio.*
Natural History
Physical Science } Secretaries.
Anthropological
Medical
Library
Mr. Justice C. C. Ghose, Kt.

Publication Committee :

President.
Treasurer.
General Secretary.
Philological
Jt. Philological } *Ex-officio.*
Natural History
Physical Science } Secretaries.
Anthropological
Medical
Library
Dr. U. N. Brahmachari.

In accordance with Rule 48(a), the General Secretary reported that the Council had made the following changes in the present Regulations regarding the Election of Fellows :—

In Regulation 8, instead of :

'There shall be a meeting of Fellows within the fortnight preceding the 7th of October, one week's notice of which shall be given to the Resident Fellows. At this meeting matters of concern to the Fellows shall be generally considered and the returned nomination papers shall be scrutinised for technical faults. It shall be competent to the meeting to remedy any such faults to prevent invalidation on this account alone'

Read :

'There shall be a meeting of Fellows within the fortnight preceding the 7th of October, one week's notice of which shall be given to the Resident Fellows. At this meeting matters of concern to the Fellows shall be generally considered and the returned nomination papers shall be scrutinised. It shall be competent to the meeting to remedy any technical faults to prevent invalidation on this account alone,'

and in addition, 'If valid nominations have been returned for more than the maximum number of new Fellows to be elected, those nominations which have received the greatest number of signatures shall be selected for inclusion in a list printed as a voting paper, to a number one higher than the total number to be elected. In the event of a tie for such selection, the Fellows present at the meeting shall decide which of the nominees having obtained the same number of signatures shall be so selected.'

In Regulation 10, instead of

'A list of persons duly nominated, with their qualifications, etc. etc.'

Read :

'A list of the persons duly nominated, and, as the case may be, selected, with their qualifications, etc. etc.'

In accordance with Rule 38, the General Secretary announced that the names of the following members, who had, since the last Ordinary Monthly Meeting, been suspended as defaulters within the Society's building, had now been removed as defaulters from the Society's registers for non-payment of dues :—

Shyam Chand Bhor
K. C. Chatterjee
N. K. Dastidar
P. C. Dutt
Jogendra Nath Maitra
Jogendra Nath Mitra
Ghulam Mohammed
K. B. Mookerjee
S. L. Varma
B. Visvanath.

In accordance with Rules 2 and 13, the Chairman called for a ballot for the election, as Honorary Fellow of the Society, of :

Shams-ul-Ulama Sir Jivanji Jamshedji Modi,

proposed for election in the last Ordinary Monthly Meeting.

The following papers were read :—

1. Chintaharan Chakravarti.—*A new Version of the Story of Solomon's Judgment.*
2. Sarat Ch. Mitra.—*On the Worship of the Deity Jalpeshwara in the District of Jalpaiguri in Northern Bengal.*
3. H. Hosten, S.J.—*The Jesuits at Agra in 1635–37.*
4. H. Hosten, S.J.—*Catholicism in the East Indies in 1860–81, from the Latin text of Fr. A. Thomas, S.J. Edited and translated.*

The following communication was made :—

1. M. Mahfuz-ul Haq.—*A note on the discovery of a fragment of the original illustrated manuscript of Tārīkh-i-Alfi, or 'the History of One Thousand Years', written for Emperor Akbar (in the collection of Mr. Ajit Ghose, Calcutta).*

The Chairman announced the results of the ballot for the election of Ordinary Members and the Honorary Fellow, and declared all candidates duly elected, the Honorary Fellow having been elected by an unanimous vote.

The Chairman, in declaring the meeting closed, invited those present to inspect a number of original specimens and reproductions illustrating Mr. Mahfuz-ul Haq's communication.

◆

APRIL, 1931.

An Ordinary Monthly Meeting of the Asiatic Society of Bengal was held on Monday, the 6th, at 5-30 P.M.

PRESENT.

Lt.-Col. R. B. Seymour Sewell, M.A., Sc.D. (Cantab.), M.R.C.S., L.R.C.P., F.L.S., F.Z.S., F.A.S.B., I.M.S., President, in the Chair.

Members :

Bose, Mr. M. M.
Das-Gupta, Mr. H. C.
Hobbs, Mr. H.
Insch, Mr. James
Jackson, Mr. P. S.
Manen, Mr. Johan van.

The minutes of the last meeting were read and confirmed.

The General Secretary reported receipt of sixteen presentations of books, etc., which had been placed on the table for inspection.

The following candidates were balloted for for election as Ordinary Members :—

(13) *Pantulu, G. V. Sitapati*, B.A., L.T., Lecturer in History, Rajah's College, Parlakimedi, Dt. Ganjam, Madras Presidency.
Proposer : Suniti Kumar Chatterji.
Seconder : Haraprasad Shastri.

(14) *Bhose, Jotish Chander*, M.A., B.L., Advocate, Calcutta High Court, 24A, Ray Bagan Street, Calcutta.
Proposer : N. K. Basu.
Seconder : Sir C. C. Ghose.

(15) *Prasad, Sharda*, Merchant, c/o Messrs. Gopinath Lal Behari, Satna, C.P.
Proposer : Chhotelal Jain.
Seconder : Johan van Manen.

The General Secretary reported the deaths of :—

(2) Dr. B. L. Chaudhuri (An Ordinary Member, 1893, Fellow 1921).
(3) Sir R. C. Temple (An Ordinary Member, 1878, Fellow 1928).
(4) Sir Charles Eliot (An Honorary Fellow, 1920).

A resolution of condolence was passed, all members standing.

The General Secretary reported the loss of membership, since the previous meeting, by resignation of :—

(9) Hirananda Sastri (An Ordinary Member, 1928).
(10) D. J. Cohen (An Ordinary Member, 1929).
(11) P. N. Agate (An Ordinary Member, 1929).

The following papers were read :—

1. H. CHAUDHURI AND GOPAL SINGH.—*The Wither-tip Disease of Citrus Plants.*
2. EKENDRANATH GHOSH.—*Studies on Rigvedic Deities. VIII. Deities connected with Asterisms.*
3. EKENDRANATH GHOSH.—*Studies on Rigvedic Deities. IX. Deities connected with Asterisms.*
4. HEM CHANDRA DAS-GUPTA.—*The Occurrence of a Pathological Triassic Ammonite in the Salt Range, Punjab.*

The following communication was made :—

1. JOHAN VAN MANEN.—*The Tibetan name for Mount Everest.*

The President announced the result of the ballot for the election of Ordinary Members and declared all candidates duly elected.

The President announced that the Fourth public Lecture of the year would be held on Tuesday, the 14th April, 1931, at 6-15 P.M.

Lecturer : Mr. O. C. Gangoly.
Subject : Chinese Buddhist Sculpture.

The President invited the members present to communicate with the General Secretary the names and addresses of non-members to whom they wished invitations to be issued.

◆

MAY, 1931.

An Ordinary Monthly Meeting of the Asiatic Society of Bengal was held on Monday, the 4th, at 5-30 P.M.

PRESENT.

LT.-COL. R. B. SEYMOUR SEWELL, M.A., Sc.D. (Cantab.), M.R.C.S., L.R.C.P., F.L.S., F.Z.S., F.A.S.B., I.M.S., President, in the Chair.

Members :

Asadullah, Mr. K. M.
Bhattacharjee, Mr. N. C.
Bhose, Mr. J. C.
Chatterjee, Mr. P. P.
Chatterji, Dr. S. K.
Coyajee, Sir J. C.
Das-Gupta, Mr. H. C.
Ezra, Sir David
Ghosh, Dr. E. N.
Guha, Dr. B. S.
Insch, Mr. James
Jain, Mr. C. L.
Manen, Mr. Johan van
Modi, Mr. J. R. K.
Suhrawardy, The Hon'ble Mr. Justice Z. R. Z., Kt.

The minutes of the last meeting were read and confirmed.

The General Secretary reported receipt of nine presentations of books, etc., which had been placed on the table for inspection.

The following candidate was balloted for for election as an Ordinary Member :—

(16) *Bottomley, John Mellor*, B.A. (Oxon), I.E.S., Offg. Director of Public Instruction, Bengal, Writers' Buildings, Calcutta.
Proposer : Upendra Nath Brahmachari.
Seconder : R. B. Seymour Sewell.

The General Secretary reported the death of :—

(5) James Peddie (An Ordinary Member, 1927).

A resolution of condolence was passed, all members standing.

The President read an obituary notice of Dr. B. L. Chaudhuri. (See page cci.)

The General Secretary reported the loss of membership, since the previous meeting, by resignation of :—

(12) Rev. A. W. Young (An Ordinary Member, 1928).
(13) R. G. Watling (An Ordinary Member, 1928).
(14) P. C. Mitter (An Ordinary Member, 1925).

The General Secretary reported that the third application for Institutional Membership had been received from :

(3) The Benares Hindu University Library, Benares,

which had been accepted by the Council.

In accordance with Rule 40, the General Secretary announced that the names of the following Ordinary Members would be removed from the Society's next member list :—

F. A. F. Barnardo.
Leonardus Stark.
W. S. Talbot.
Baron Rudt von Collenberg.
Miss G. M. Wright.
Muni Jinavijayaji.

The following papers were read :—

1. James Hornell.—*String Figures from Gujarat and Kathiawar.*
2. Ekendranath Ghosh.—*Studies on Rigvedic Deities. X. Vasus.*
3. Ekendranath Ghosh.—*Studies on Rigvedic Deities. XI. Heavenly Dogs.*
4. Sir J. C. Coyajee.—*The House of Gotarzes : A chapter of Parthian History in the Shahnameh.*
5. H. Hosten, S.J.—*Description of Indostan and Guzarat, by Manuel Godinho de Eredia* (1611). *Translated and edited.*

The following communication was made :—

1. M. Mahfuz-ul Haq.—*A note on two interesting Manuscripts of Tuhfa-i-Sāmi* (*fols.* 181) *of Sām Mirzā Safawī, and Dalā'il-ul-Khairāt* (*fols.* 74, *an Arabic prayer book*) *in the Library of the Asiatic Society of Bengal.*

The President announced the result of the ballot for the election of the Ordinary Member, and declared the candidate duly elected.

◆

JUNE, 1931.

An Ordinary Monthly Meeting of the Asiatic Society of Bengal was held on Monday, the 1st, at 5-30 p.m., for the election of Ordinary Members and the transaction of business.

Present.

Lt.-Col. R. B. Seymour Sewell, M.A., Sc.D. (Cantab.), M.R.C.S., L.R.C.P., F.L.S., F.Z.S., F.A.S.B., I.M.S., President, in the Chair.

Members :

Bhattacharji, Mr. U. C.
Bhose, Mr. J. C.
Bose, Mr. M. M.
Brahmachari, Dr. U. N.
Chatterji, Mr. P. P.
Collet, Mr. A. L.
Das-Gupta, Mr. H. C.
Ghose, Mr. B. B.
Ghose, Mr. T. P.
Ghosh, Dr. E. N.
Ghoshal, Dr. U. N.
Hosain, Dr. M. Hidayat
Manen, Mr. Johan van
Rao, Dr. H. S.
Vidyabhusana, Mr. A. C.

The minutes of the last meeting were read and confirmed.

The General Secretary reported receipt of fifteen presentations of books, etc., which had been placed on the table for inspection.

The following candidate was balloted for for election as an Ordinary Member :—

(17) *Lort-Williams, The Hon'ble Mr. Justice John*, K.C., Barrister-at-Law, Judge, High Court, 24, Alipur Park South, Calcutta.
Proposer : Jas. Insch.
Seconder : Johan van Manen.

The General Secretary reported the loss of membership, since the previous meeting, by resignation of :—

(15) J. Jacob (An Ordinary Member, 1929).
(16) F. G. Dikkers (An Ordinary Member, 1928).
(17) A. D. MacGregor (An Ordinary Member, 1924).
(18) S. N. Banerjee (An Ordinary Member, 1926)
(19) N. G. Majumdar (An Ordinary Member, 1924).
(20) Nawab Moin Yar Jung Bahadur (An Ordinary Member, 1926).
(21) C. A. Henry Edwards (An Ordinary Member, 1926).

The General Secretary reported that the election of :

(1) Narain Ch. Roychaudhury (Elected on 5-1-31),

had become null and void under Rule 9.

The General Secretary reported that the fourth application for Institutional Membership had been received from :

(4) The Otani University Library, Kyoto, Japan,

which had been accepted by the Council.

The President announced the result of the ballot for the election of the Ordinary Member and declared the candidate duly elected.

◆

JULY, 1931.

An Ordinary Monthly Meeting of the Asiatic Society of Bengal was held on Monday, the 6th, at 5-30 P.M.

PRESENT.

LT.-COL. R. B. SEYMOUR SEWELL, M.A., Sc.D. (Cantab.), M.R.C.S., L.R.C.P., F.L.S., F.Z.S., F.A.S.B., I.M.S., President in the Chair.

Members :

Asadullah, Mr. K. M.
Bhattacharya, Mr. U. C.
Bhose, Mr. J. C.
Bose, Mr. M. M.
Brahmachari, Dr. U. N.
Chatterji, Mr. P. P.
Das-Gupta, Mr. H. C.
Ghose, Mr. B. B.
Gurner, Mr. C. W.
Haq, Mr. M. Mahfuz-ul
Insch, Mr. James
Manen, Mr. Johan van
Shastri, MM. H. P.

The minutes of the last meeting were read and confirmed.

The General Secretary reported receipt of eighteen presentations of books, etc., which had been placed on the table for inspection.

The General Secretary reported that there had been no loss of membership since the previous meeting by death, but announced the deaths of :—

Pundit Lakshman Shastri (one of the Editors of the Bibliotheca Indica), and

Lt.-Col. Auguste Bonifacy, a distinguished Orientalist of France.

The General Secretary reported the loss of membership, since the previous meeting, by resignation of :—

(22) Dabiruddin Ahmad (An Ordinary Member, 1929).
(23) D. M. Bose (An Ordinary Member, 1927).
(24) N. Ottens (An Ordinary Member, 1923).
(25) H. G. Von Oven (An Ordinary Member, 1930).
(26) G. Keable (An Ordinary Member, 1928).

The General Secretary reported that the election of :

(2) Hon'ble Kwaja Nazim-ud-Din (Elected on 3-3-1930), and
(3) Hon'ble Mr. S. C. Ghose Maulik (Elected on 3-3-1930),

had become null and void, under Rule 9.

The following papers were read :—

1. M. Z. Siddiqi.—*Poets in early Arabia.*
2. Sri Ram Sharma.—*A little known Persian Version of Valmiki Ramayana.*
3. U. N. Brahmachari.—*A therapeutic Salvarsan Derivative allied to Sulpharsenobenzene as prepared in India.*

The following exhibits were shown and commented upon by MM. Haraprasad Shastri :—

1. Photographs of two Satī-pillars from Unao in Bundelkhand.
2. A Manuscript of Kathā-sarit-sāgara composed in Kāśmīr, about 1070, by Somadeva Bhaṭṭa.

Between the explanations of the two exhibits Col. Sewell, whose presence was required elsewhere, vacated the chair which was then occupied by Dr. U. N. Brahmachari.

◆

AUGUST, 1931.

An Ordinary Monthly Meeting of the Asiatic Society of Bengal was held on Monday, the 3rd, at 5-30 P.M.

PRESENT.

Lt.-Col. R. B. Seymour Sewell, M.A., Sc.D. (Cantab.), M.R.C.S., L.R.C.P., F.L.S., F.Z.S., F.A.S.B., I.M.S., President, in the Chair.

Members :

Asadullah, Mr. K. M.
Brahmachari, Dr. U. N.
Brown, Mr. Percy
Das-Gupta, Mr. H. C.
Ghosh, Dr. E. N.
Guha, Dr. B. S.
Manen, Mr. Johan van
Ray, Mr. J. M.
Sarvadhikary, Sir D. P.
Shastri, MM. H. P.
Siddiqi, Dr. M. Z.
Sircar, Mr. Ganapati

Visitor :

Bhaduri, Mr. S. N.

The minutes of the last meeting were read and confirmed.

The General Secretary reported receipt of fifteen presentations of books, etc., which had been placed on the table for inspection.

The following candidate was balloted for for election as an Ordinary Member :—

(18) *Barua, The Hon'ble Kanak Lal,* Rai Bahadur, B.L., President, Kamarupa Anusundhan Samiti, Minister to the Government of Assam, Shillong, Assam.
Proposer : K. C. De.
Seconder : R. B. Seymour Sewell.

The General Secretary reported the death of :—

(6) Rai Bahadur S. C. Sarkar (An Ordinary Member, 1922).

The General Secretary reported the loss of membership, since the previous meeting, by resignation of :—

(27) D. P. Khaitan (An Ordinary Member, 1926).
(28) I. J. S. Taraporevala (An Ordinary Member, 1925).
(29) Rudra Dutta Sinha (An Ordinary Member, 1913).
(30) T. N. Seth (An Ordinary Member, 1930).
(31) H. P. Chaudhuri (An Ordinary Member, 1926).

The General Secretary reported that the election of :

(4) G. V. Sitapati Pantulu (Elected on 6-4-31),

had become null and void, under Rule 9.

The following papers were read :—

1. R. B. SEYMOUR SEWELL.—*The Temperature and Salinity of the Deep Water of the Bay of Bengal and Andaman Sea.*
2. EKENDRA NATH GHOSH.—*Studies on Rigvedic Deities. XII. Div, Antariksa, and Prithivi.*

The following communications were made :—

1. MM. H. P. SHASTRI.—*The Brahman who consecrated the temple of Jagannatha in* 1118 *A.D. at Puri and his descendants down to the seventeenth century.*
2. EKENDRA NATH GHOSH.—*Some remarks on Rele's recent interpretations of the Vedic Gods as figures of Biology.*

The President announced the result of the ballot for the election of the Ordinary Member, and declared the candidate duly elected.

The President announced that in view of the advance hours, a communication by Mr. Johan van Manen on 'Problems of Geographical nomenclature connected with the Kangchendzönga and its surroundings' would be deferred to the next meeting.

The President announced that unless special notice was given there would be no Monthly Meetings during the recess months of September and October.

◆

NOVEMBER, 1931.

No meeting.

◆

DECEMBER, 1931.

An Ordinary Monthly Meeting of the Asiatic Society of Bengal was held on Monday, 7th, at 5-30 P.M.

PRESENT.

RAI UPENDRA NATH BRAHMACHARI, BAHADUR, M.A., M.D., Ph.D., F.A.S.B., Acting President, in the Chair.

Members :

Agharkar, Dr. S. P.
Asadullah, Mr. K. M.
Bose, Mr. M. M.
Brown, Mr. Percy
Chakravarti, Mr. Chintaharan
Chakravarti, Mr. Nilmani
Chatterji, Mr. M. M.
Das-Gupta, Mr. H. C.
Deb, Raja K.
Dutta, Mr. K. C.
Fermor, Dr. L. L.
Ghoshal, Dr. U. N.
Ghose, The Hon'ble Mr. Justice C. C., Kt.
Hobbs, Mr. H.
Insch, Mr. James
Manen, Mr. Johan van
Ray, Mr. J. M.

Visitors :

Das, Mr. S. V.
Dutt, Mr. R. S.
Dutt, Mr. S. N.
Gangooly, Mr. P.
Ray, Mr. N. C.
Sarkar, Mr. B. N.

The minutes of the last meeting were read and confirmed.

The General Secretary reported receipt of thirty-five presentations of books, which had been placed on the table for inspection.

The General Secretary announced that the following candidate had been elected an Ordinary Member, during the recess months, September and October, under Rule 7 :—

(19) *Eliade, Mircea,* Docteur en Philosophie, Conferentiaire Universitaire, 1, Str. Melodiei, Bucharest (1).
Proposer : R. B. Seymour Sewell.
Seconder : Johan van Manen.

The General Secretary reported the death of :—

(7) H.H. Prabhu Narain Singh, Maharajah of Benares (An Ordinary Member, 1899).
(8) Jogindra Nath Sen (An Ordinary Member, 1902).
(9) Jateendra Nath Mukherjee (An Ordinary Member, 1899).
(10) Narendra Nath Raye (An Ordinary Member, 1920).
(11) MM. Haraprasad Shastri (A Life Member, 1885, Fellow, 1910).

The General Secretary reported the death of two old and distinguished relations of the Society :—

1. H. M. Percival.
2. Rai Bahadur P. N. Mookerjee.

The General Secretary reported the loss of membership, since the previous meeting, by resignation of :—

(32) E. C. Ormond (An Ordinary Member, 1925).
(33) H. P. Podder (An Ordinary Member, 1925).
(34) R. H. van de Vijver (An Ordinary Member, 1928).
(35) M. R. Oak (An Ordinary Member, 1926).
(36) B. De (An Ordinary Member, 1926).
(37) Lord Meston (An Ordinary Member, 1926).
(38) E. L. G. Clegg (An Ordinary Member, 1927).
(39) Benoy Kumar Sen (An Ordinary Member, 1928).
(40) Mohammed Sanaullah (An Ordinary Member, 1925).
(41) D. E. Reuben (An Ordinary Member, 1925).
(42) E. H. Staples (An Ordinary Member, 1927).
(43) S. C. De (An Ordinary Member, 1927).
(44) P. N. Tagore (An Ordinary Member, 1929).
(45) H. Browne (An Ordinary Member, 1924).
(46) M. Afzal Husain (An Ordinary Member, 1926).
(47) M. Ahmad Ali Khan (An Ordinary Member, 1915).
(48) E. V. MacLean (An Ordinary Member, 1929).
(49) Susil Chandra Chatterjee (An Ordinary Member, 1928).
(50) Sir B. Narasimha Sarma (An Ordinary Member, 1927).
(51) A. H. Mackenzie (An Ordinary Member, 1930).
(52) E. R. Gee (An Ordinary Member, 1925).

The General Secretary reported that the fifth application for Institutional Membership had been received from :

(5) The Annamalai University Library, Annamalainagar, Chidambarom, S. India,

which had been accepted by the Council.

In accordance with Rules 37 and 38, the General Secretary announced that the names of the following Ordinary Members would be suspended as defaulters within the Society's building for the period of a month to be removed from the Society's registers for non-payment unless the amount due be paid before the next Ordinary Monthly Meeting :—

Kali Das Bhanot.
Diwan Ram Chandra Kapur.
A. Subba Rao.
Mohammed Amin Abbasi.
Khan Bahadur Asaduzzaman.
D. N. Gupta.
Pt. Hargopal.
S. C. Mookerjee.
V. Narayanaswami.
Bhabendra Chandra Ray.
Sir Abdulla Suhrawardy.

The General Secretary reported that, in accordance with Rule 47, the senior Vice-President Rai Bahadur Dr. U. N. Brahmachari would officiate as President, in place of the President, Lt.-Col. R. B. Seymour Sewell, absent from India from the 19th September, 1931.

In accordance with Rule 45, the General Secretary announced that the Council submit for confirmation to the meeting the following change in the composition of the Council, made in the last Council meeting on 30th November, 1931 :—

Honorary Treasurer : Mr. James Insch,
vice Mr. K. C. Mahindra, resigned.

The appointment was confirmed.

The Chairman called upon the General Secretary to address the meeting on the subject of the late MM. Haraprasad Shastri.

The Chairman requested those present to rise in respect for the late MM. H. P. Shastri and to pass a resolution as follows :—

'That the Society do hereby express its great sorrow and grief at the demise of its ex-President, Council Member, Fellow, Member of long standing and most active and brilliant co-worker, the late Mahamahopadhaya Dr. Haraprasad Shastri, C.I.E., M.A., D.Litt., F.A.S.B., and do place on record its appreciation of the great services which MM. H. P. Shastri has rendered to scholarship in general and to the Asiatic Society of Bengal, in particular, as well as its respect and affection for his person.'

The resolution was adopted unanimously, all present standing.

* * *

OBITUARY NOTICES.

B. L. CHAUDHURI.

(1866–1931.)

Dr. Chaudhuri was the youngest surviving son of Harkisore Chaudhuri and a descendant of an old zamindar family that had settled in the district of Mymensingh as early as 1587 A.D. He was born at his family residence in Sherpur on 11th September, 1866. His early education was obtained locally but in 1886 he succeeded in obtaining a Government scholarship and after matriculation entered the University of Calcutta and joined the Presidency College where he studied science under Professors P. K. Ray, Sir Jagadis Bose, and Sir P. C. Ray. After passing his 1st examination in Arts, he, for a short time, joined the Medical College but finding medical work not to his liking he rejoined the Presidency College and took his B.A. degree in 1891. In order to further his studies Dr. Chaudhuri then went to Scotland and joined the University of Edinburgh, graduating as a B.Sc. in 1893. After his return to India Dr. Chaudhuri settled for some years in the Mymensingh district where he was engaged in very useful work as a Municipal Commissioner and an Honorary Magistrate. In 1901, he settled in Calcutta where he remained for the rest of his life. During the early years of his residence in this city he acted as Honorary Secretary of the Bengal Landholders' Association and rendered much valuable service in the improvement of indigenous arts and crafts, notably in the improvement of automatic hand looms; he was also invited to lecture on Botany and Zoology at the Science Association, which he did without any remuneration, at the same time carrying on his own original investigations in the Science Association's laboratory. For many years Dr. Chaudhuri retained his connection with this Association and was for years one of its Vice-Presidents.

His Zoological work may be said to have commenced in 1905, at the time of the appointment of the Fisheries Commission, under the Chairmanship of Sir K. G. Gupta, I.C.S. The Commission carried out investigations along nearly the whole of the eastern coastal waters of Bengal and when Sir K. G. Gupta relinquished the chairmanship in 1908, Dr. Chaudhuri was selected to fill a vacancy in the Zoological and Anthropological Section of the Indian Museum, being appointed by Viscount Morley, then Secretary of State for India, and, in consequence of his experience and knowledge, was placed in charge of the Fish Collections. It was in the year 1911 that I first made Dr. Chaudhuri's acquaintance when I came to Calcutta after my first season on board the R.I.M.S. '*Investigator*' and during the next few months I was collaborating with him in the preparation of a small pamphlet, published by the Trustees of the Indian Museum, on fish that devour Mosquito-larvæ; this was my first piece of Zoological research work and it is characteristic of Dr. Chaudhuri's retiring disposition that he permitted my name to appear first on the title-page. In 1913, he was awarded the degree of Doctor of Science by the University of Edinburgh, and in 1916 on the conversion of the Zoological and Anthropological Section of the Indian Museum into the Zoological Survey of India he became one of the first four Officers and the only Indian Gazetted Officer with the rank of Assistant Superintendent. He continued to hold this post till he reached the age limit of 55, and he retired from the Survey on September 16th, 1921. After his retirement Dr. Chaudhuri was invited to help the Carmichael Medical College and was appointed Honorary Professor of Zoology, a post that he continued to hold until his death. During his period of service in the Zoological Survey he devoted his time in the Museum largely to taxonomic Ichthyology, in which he published several important papers, notably on the fresh water fish of the Ganges and on the fish of the Chilka Lake. That his work was widely appreciated is shown by the fact that he was at one time or other elected a Fellow of the Linnean Society of London and of the Royal Society of Edinburgh.

Dr. Chaudhuri first joined the Asiatic Society of Bengal in 1893 and was elected to a Fellowship of this Society in 1921. At the time of his death he was one of our oldest members. He was also one of the earliest members of the Indian Science Congress and was present at its inaugural meeting here in the Society's rooms in 1914: in 1918 he was President of the Zoological Section and he also at one time served as a member of the General Committee.

Although his chief interest lay in Zoology, Dr. Chaudhuri was a man of wide learning and still wider sympathies and he took particular interest in such diverse subjects as Indian Archæology, Indian Painting, Child Psychology, Bengali Literature and in Education. There was scarcely a single lecture given in Calcutta that he didn't attend and he was a constant visitor at the courses of lectures given annually under the auspices of the Trustees of the Indian Museum. He was also deeply interested in social welfare work; for many decades he was connected with the Young Men's Christian Association, and he was actively connected with the Temperance movement, being a Vice-President of the Temperance Society at the time of his death. To the end of his days he took an active interest in Zoological affairs and was a member of the Committee of management of the Zoological Gardens at Alipore.

In Dr. Chaudhuri we mourn the loss not only of a member and Fellow of this Society and a distinguished Indian Zoologist, but of one who was a personal friend and a man of great charm of character and sterling worth.

R. B. SEYMOUR SEWELL.

(*Read in the Monthly Meeting on the 4th May,* 1931.)

SIR RICHARD CARNAC TEMPLE.

(1850–1931.)

Sir Richard Carnac Temple, the great administrator and the great Indologist, who always bore undiminished affection to India and her people, passed away on the 3rd March, 1931, at Territet in Switzerland. Many ties, visible and invisible, bound him fast to this country. Like Thackeray, he was born in India. While the former saw the light in Calcutta, the latter was born in Allahabad. The fathers of both were in the Civil Service in India. But while Thackeray cut a career for himself in England, Sir Richard Temple served India and carved his career here by coming in contact with the people and studying their diverse culture. He joined the Royal Scott Fusiliers in 1871 and came to India where after a few years he was transferred to the Indian Army. After serving in the Second Afghan War (1878-9) where he secured the medal and was mentioned in Despatches, he began his administrative career as Cantonment Magistrate in the Punjab. He was transferred to Burma when the Third Burmese War broke out in 1885. After the conclusion of the war, he played an important part in the pacification and settlement of Mandalay on the annexation of Upper Burma. Eventually he became Official President of Rangoon Municipality and Port Commission where he left a permanent mark on the development of the Port. This led to his promotion in 1894 to the responsible position of Chief Commissioner of the Andaman and Nicobar Islands where he remained till his retirement in 1904.

Whatever post he occupied in his administrative career in India, he discharged his duties so efficiently and so satisfactorily that he pleased not only the Government but the people. In fact, he had a genuine love for the people of India and its unique culture. In whatever part of India his official duties lay, he never lost an opportunity of studying the people, their manners, customs and even superstitions with such a sympathy and thoroughness that he became an undoubted authority on the subject. He was a most prolific writer of his time; and though his writings were connected with multifarious subjects, such as, ethnology, linguistics, customs and beliefs of the different tribes and peoples, his descriptions were found to be always faithful and accurate, and his conclusions, thoughtful and incontrovertible. In fact, he was certainly the foremost and perhaps the last of that race of Britishers, who blended in themselves the administrative capacity of a most efficient character and scholarship of a high order. Such were Alexander Cunningham who was in the Military Service, Ibbetson and Risley who were with the Government of India, and Campbell and Fleet with the Government of Bombay. One wonders whether this race of British scholar-administrators has become extinct with the death of Sir Richard Temple. That would indeed be a great calamity to this country. For unless the British officials who are at the helm of affairs in India are conversant with the history and culture of the country, they cannot reasonably be expected to sympathize with the aspirations of the people and help them in the formation of one nation.

It will thus be seen that Sir Richard Temple was not only an excellent administrator but also a sound scholar. But this is not all. He was also a public worker and philanthropist. He evinced his various activities in these spheres after his retirement from service. This was no doubt a serious loss to India but a unique gain to England, for after his retirement he threw himself wholeheartedly into the public work of his own country, and we know what services he rendered to the Territorial Army Association, of which he was Chairman from 1908–1927, and the St. John Ambulance Association, of which he was created Bailiff Grand Cross in 1927.

When we find administrative capacity, scholarly attainments and unostentatious public service rolled into one as was no doubt the case with Sir Richard Temple, it is no wonder if Honours came in quick succession upon him, not only from Government but also from learned and philanthropic Societies. To give a list of such Honours as fell to his lot or to give a list of his numerous and manifold publications in the scholarly field would occupy far more space than is allotted to an obituary notice. Besides, we are so well acquainted with them that such lists are sure to prove tautologous and irksome.

The above Notice, however, gives no insight into Sir Richard Temple as a man. But whoever came in contact with him and enjoyed his hospitality at the Nash in Worcester where his Baronetcy was situated, are unstinted in their praise of him and of his thousand and one qualities of head and heart. The writer of this Notice was not, however, so lucky. Nevertheless, he had occasion to see Sir Richard Temple once in Bombay during the last war when he had come to India in connection with Ambulance work. Besides, he was for ever in correspondence with the Baronet in connection with the editorial work of the *Indian Antiquary*. And he has no hesitation in saying that Sir Richard Temple was a thorough English gentleman. He never meddled with my work. On the contrary, he gave me more powers to discharge my editorial function than perhaps I deserved, although he was the Chief Editor and Proprietor of the *Indian Antiquary*. When I wanted his advice, he always gave it ungrudgingly and fully. Whenever I received and read his letters, I was overpowered by his suavity of manners and sincerity of heart. His advice was always of the most practical character. I do not know whether he and the *Indian Antiquary* gained anything by my being associated with them from 1911 to 1922, but this much is certain that my gain was considerable, as I had such an experience of the high and lofty duties of an editor as I would never have obtained if I had not been connected with a learned and long-standing Journal like the *Indian Antiquary* and not associated with so gentlemanly a savant as Sir Richard Temple.

D. R. BHANDARKAR.

MAHAMAHOPADHYAYA DR. HARAPRASAD SASTRI.

(1853–1931.)

The passing away of Mahamahopadhyaya Haraprasad Sastri on the 17th of November, 1931, at the age of 78 is an irreparable loss to Indian scholarship. It is a loss which has particularly affected the Asiatic Society of Bengal, intimately connected as he was with the Society for over 46 years, right up to the day of his death. Haraprasad Sastri was one of the brilliant scholars of the preceding generation, a Sanskritist of the old type, who was a repository of traditional learning and at the same time a scholar and antiquarian with up-to-date outlook and equipment. He was a link with the past, with that brilliant first and second generation of Indian scholars and orientalists and writers of distinction which included men like Rajendralala Mitra, Bhagawanlal Indraji, Dr. Bhau Daji, Mahamahopadhyaya Pandit Sudhakar Dvivedi, Ramendra Sundar Trivedi, Prem Chand Tarkavagisa, Chandrakanta Tarkalankara, Satyavrata Samasrami, Ramdas Sen, Umesh Chandra Vatavyal, Iswar Chandra Vidyasagar, Bankim Chandra Chatterji, Romesh Chunder Dutt, and others: one might almost be tempted to use the rather hackneyed phrase about Mahamahopadhyaya Haraprasad Sastri also: 'he was the last of the giants'.

Haraprasad Sastri's career was a long and useful one spent in teaching and research. It was the quiet and uneventful life of a scholar and educationist, with nothing exciting in it except a number of journeys away from his home to distant parts of India (including several in Nepal) undertaken in connection with his study and research. Born in 1853, his early career was that of a brilliant student at school and college and then of a lecturer in the Sanskrit College in 1883 (of which institution he became Principal in 1900). He served the Government of Bengal in other capacities also, having been Assistant Translator and Librarian to the Bengal Government Library (1886–1894), and assisting the Government with his advice and his technical knowledge whenever required. He was made the first incumbent of the chair of Sanskrit at the University of Dacca (1921). His learning and his high position in the field of scholarship and of Bengali literature were recognized on all hands. The Government conferred on him the titles of *Mahāmahopādhyāya* (1898) and *Companion of the Indian Empire* (1911). He was elected President of the *Vangīya Sāhitya Parishad* for a number of years, and he was President of the Eighth as well as the Fifteenth *All-Bengal Literary Conference* in 1914 and 1924, and of the Fifth *All-India Oriental Conference* (Lahore, 1928). The University of Dacca gave him the title of D.Litt. *Honoris Causa* in 1927. In 1931, the *Vangīya Sāhitya Parishad* presented him with a volume of essays, in Bengali, in commemoration of his 75th birthday.

Haraprasad Sastri's connection with the Asiatic Society of Bengal began in 1885, when he was elected a member of the Society as a young Professor of the Sanskrit College. He was soon made a member of the Philological Committee and was placed in charge of the publications in the *Bibliotheca Indica*. In 1891 he directed the search for Sanskrit MSS. undertaken under the auspices of the Asiatic Society of Bengal, and in 1909 he was commissioned by the Asiatic Society of Bengal on behalf of the Government of India to report on the Bardic MSS. in Rajputana. In 1910 he was made a Fellow of the Society, and he became President of the Asiatic Society of Bengal for two years in 1919–1921. Later, he continued to act as Philological Secretary of the Society, which office he held up to his death.

His activities in the Society were very wide in scope. He contributed some sixty articles and notes to the *Journal and Proceedings* of the Asiatic Society of Bengal, beginning from the year 1890, covering a remarkably diverse group of subjects which showed his wide reading and wide interests. One or two monographs also appeared in the *Memoirs* of the Asiatic Society. Notices of Sanskrit MSS. (in four parts), Reports on the Search for MSS. (in 5 parts), and Descriptive Catalogues of Sanskrit MSS. (particularly in the Society's collection, 8 volumes published besides others partially prepared) present a solid mass of material for the history of Sanskrit literature. Besides as many as 8 texts were edited by him for the Society

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and published in the *Bibliotheca Indica* series and as *Memoirs* of the Society. Of these texts, some (e.g. the *Rāmacarita* of Sandhyākaranandin and the *Saundarānanda* of Aśvaghoṣa) are of very great importance for ancient Indian history and literature.

Beginning from 1880, Haraprasad Sastri's literary *œuvres* in Bengali and English present quite a mass of new and significant enquiry into the history and culture of ancient India and into Sanskrit and Vernacular literature. The carefully compiled list of Sastri's articles, editions, monographs, etc. recently published by Kumar Dr. Narendra Nath Law in his *Indian Historical Quarterly* (Haraprasad number, vol. IX, No. 1, March, 1933, pp. 372–414) enumerates some 320 items. Among Sastri's achievements we may note that he discovered and presented before the learned world some materials of first rate importance for the history of Bengali language and literature (e.g. his edition of the *Dharma-maṅgala* of Māṇik Gāṅgulī, and pre-Mohammedan Bengali and Apabhraṃśa poems and couplets published in his *Bauddha Gān O Dohā*); for that of Maithili (notice of the unique MS. of the *Varṇa-ratnākara* of Jyotirīśvara Ṭhākura, the oldest Maithili work known, and edition of the *Kīrttilatā* of Vidyāpati), and for Sanskrit. He popularised Buddhistic studies in Bengal more than anybody else; and almost intuitively he discovered numerous traces of Buddhism as a substratum in the popular religion of Bengal and Eastern India. He was not a mere antiquarian and archæological scholar: his position as Bengali *prosateur* is unrivalled, and his racy and very clear articles have made the results of antiquarian study and research available to the average Bengali reader in a way that is unsurpassed. Further, as the author of *Vālmīkir Jay*, *Kāñcanamālā*, and *Beṇer Meye* his position as a novelist in Bengali, who made the past live once again, has become established for all time. Many of his essays and papers will remain classic things of their kind in Bengali literature. Dr. N. N. Law's critical survey in the *Indian Historical Quarterly* of Haraprasad Sastri's literary output makes abundantly clear the many-sidedness of his activity as an educationist, as a scholar, and as a man of letters.

The *man* Haraprasad Sastri, however, did not lose himself in the scholar. His was a living personality which could not but impress those who came in touch with it. Always affable and ready to help with his vast stock of learning, he was like a mine from which one could extract many a precious jewel of information and many a striking opinion or suggestion. Endowed with a very keen sense of humour and power of observation as he was, his conversation was always enjoyable, filled with sly remarks and *bons mots*. He admired frankness and was suspicious of unsympathetic criticism of others, or of the least manifestation of a desire for exploitation. But he was always

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eager to acclaim real merit and give it its due publicity. Above all, he lived for an ideal, and that was the old Brahman ideal of knowledge of learning for its own sake. Himself living the strict life of an orthodox Brahman *Pandit*, he was liberal in his outlook and advocated social reform. He took an active part in the civic administration of his native town of Naihati, some thirty miles to the north of Calcutta, and the local municipality made him its chairman and named a street after him. He was indefatigable in his labours, and cheerful under most trying circumstances. An accidental fall broke his thigh at the age of 71, which necessitated the use of crutches for the last few years of his life, and he took all this physical suffering in a spirit of cheerful resignation that could not but draw the admiration of those who saw him.

Such was the man Haraprasad Sastri: and he was more. He was also the loving *guru* and the affectionate friend with a strong loyalty for the institutions and societies through which he could work for his ideals. This was made abundantly clear by his relations with the Sanskrit College, the *Vaṅgīya Sāhitya Parishad*, and the Asiatic Society of Bengal. By his death the Society has lost not only an energetic worker but also a genuine friend.

S. K. CHATTERJI.

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